

# The Mining Journal

## RAILWAY AND COMMERCIAL GAZETTE,

No. 505.—VOL. XV.]

LONDON: SATURDAY, APRIL 26, 1845.

[PRICE 6D.]

**TWO VALUABLE STEAM-ENGINES FOR SALE,** at WHEEL KITTY, in the parish of St. Agnes, Cornwall.—TO BE SOLD, BY AUCTION, by Mr. Penberthy, at Wheel Kitty, in the parish of St. Agnes, on Wednesday, the 14th May next, by Twelve o'clock at noon, a 41-hp. STEAM PUMPING-ENGINE, with brass condensing valve, 6-hp. stroke, equal beam, boiler eight tons, with steam-pipes, &c., complete; a 16-hp. STEAM WHIM-ENGINE, four feet stroke, with fly-wheel, shaft, and crank—whim and shaft to fit. Also a spare FLY-WHEEL, to suit the above. For view, and particulars, apply at the mine. A punctual attendance is requested, as they will be sold without reserve.—Helston, April 25, 1845.

Freehold Copper Rolling Mills, Hammer Mills, Furnaces, Refinery, Foundry, and Factory, with very valuable water-power, with a fall of above 6 feet 8 inches, on the River Wandie, in Garraill-land, Wandsworth, Surrey, fully equal to between 70 and 80-horse power, all well enclosed, with a Manager's Dwelling-house, good Garden, numerous Workmen's Cottages, with Gardens, and several valuable parcels of Meadow Land, containing altogether nearly twenty acres, most elegantly situated, within one mile and a half of Wandsworth, in the county of Surrey, and about seven miles from London.

**MESSERS. DRIVER** have received instructions to OFFER to PUBLIC COMPETITION, at the Mart, on Tuesday, the 27th of May, at Twelve o'clock, the above most valuable and desirable FREEHOLD PREMISES, exonerated from land tax, which are now, and have for nearly a century and a half, been worked by the Governor and Company of Copper Mines in England. The premises comprise a convenient small dwelling-house for a manager, with a most excellent garden; a building, about 98 feet by 70 feet, called the Rolling Mill, and a very capital iron water wheel, 18 feet diameter by 14 feet in width; a hammer mill, about 70 feet long, with two other water-wheels, one 15 feet and the other 12 feet diameter; a new building called the Refinery and Foundry, about 85 feet by 42 feet, with three furnaces, stabling, sundry shops, and a counting-house; an Artesian Well, 166 feet deep, with 5-inch copper pipes; twelve workmen's cottages, and sundry parcels of most desirable and valuable meadow land, containing altogether about twenty acres.

To be viewed on application to Mr. Bashford, residing on the premises, of whom printed specifications, with plans annexed, may be had. Specifications and plans may also be had at the Spread Eagle, Wandsworth; at the offices of the company, Old Broad-street; of Messrs. Boy, Hunt, and Co., solicitors, Lombury; at the Auction Mart, near the Bank; and of Messrs. Driver, surveyors and land agents, 8, Richmond-terrace, Parliament-street, London.

**MINING MATERIALS FOR SALE.—FOR SALE,** at the ROSKAR MINES, BY PRIVATE CONTRACT, a very good LOT of WORKING MATERIALS, consisting of plunger poles, stuffing-boxes, and glands, varying in size from 3 to 16-inch, with cases to match; sundry working barrels and pumps, centres for water-wheels, tooth-wheels, gudgeons, &c.; several 5 and 6-inch strapping plates, caps and plates for balance-bob, rollers, &c.

For viewing the same, apply to the agents at the respective mines. Dated Roskar Mines, April 2, 1845.

STAFFORDSHIRE.

**COAL AND IRONSTONE MINES.—TO BE SOLD,** BY AUCTION, in the month of MAY next, by Mr. CORBETT, auctioneer, Helston, the valuable FREEHOLD ESTATE and COLLIERIES, situated at Darlaston-green, adjoining to the Birmingham Canal and the Grand Junction Railway, containing about sixty acres; and also the MINES and MINERALS under the same; together with the ENGINE, PITS, the very complete CEMENT-WORKS, FREESTONE QUARRY and MACHINERY thereon.

N.B.—The Birmingham Coal Company are now sinking a shaft to prove the Ironstone Mines, especially the Blue Flint, in the upper part of the estate—the lower part having already been sufficiently proved by the practical working of the same.

For further information apply to Mr. Rawlin, solicitor; Messrs. Tyndall and Son, solicitors; Mr. Lawrence, at the Birmingham Coal Company's Offices, all of Birmingham; Messrs. Cope and Son, mine agents, West Bromwich; or to the auctioneer, Helston.

**COPPER MINE, NORTH WALES.—TO BE SOLD,** BY PRIVATE CONTRACT, all three valuable MINES and VEINS of COPPER ORE, and OTHER MINERALS, under lands 600 acres in extent, called LLWYDUBEN, in the parish of Bodelogri, in the counties of Merioneth and Carnarvon, held under a lease, of which fifteen years are unexpired, subject to a royalty originally of 1-12th, but reduced to 1-16th, of the ore raised and made fit for sale, and under covenants highly favourable to the lessee; and there is no doubt that, if it be bought of, a new lease for an extended term may be obtained. The mine has been opened about seven years, and having been brought into a good working state, at considerable expense, a moderate outlay will now suffice to carry on the works, on an extensive scale, with every prospect of immediate and ample returns; large quantities of rich copper ore have already been raised and sold. There is a horse-wheel set up for working the mine by a shaft, and apparatus complete; also a small shop, bucking houses, and other offices and buildings for cleaning and dressing the ore, with sundry mining implements. A good cart-road connects the works with an excellent turnpike-road, leading to the shipping place (Portmadoc), a distance of about five miles.

To any capitalist or company of proprietors these works present not only a safe but a most eligible investment, rather than an ordinary mining speculation.

Further particulars may be obtained on application to Mr. Pritchard, Goat Hotel, Bodelogri.

**VALUABLE LEAD MINE FOR SALE.—TO BE SOLD,** either the WHOLE or PART of that promising LEAD WORKS, called CRAIG-Y-MWN, near Llanrhadr, in the county of Denbigh, consisting of an extensive tract of rich MINERAL GROUND, and in the immediate neighbourhood of the old noted lead-works, called Llansgynno, Several tons of lead are now lying on the surface, and its position renders it most advantageous for the bringing in of a deep level to cut water the works.—Satisfactory reference can be given.

For terms and particulars apply to Mr. Bibby, of Llanfyllin, Montgomeryshire.

**VALUABLE LEAD MINES, SHROPSHIRE.—TO BE LET,** ON LEASE, with immediate possession, a considerable MINING DISTRICT, in the SOUTH of SHROPSHIRE, containing several valuable and productive LEAD MINES, in full work, having engines and other machinery, and every requisite for actually carrying on the same, which the lessee will have the option of purchasing by valuation. The district is full of valuable mineral products, and the mines now offered on lease have long yielded large quantities of ore, with every prospect of becoming still more productive, if prosecuted with spirit.

For particulars apply to Mr. How, solicitor, Shrewsbury.

**AN EXTENSIVE QUARRY OF IRONSTONE ON SALE**

IN NORTH WALES, situated near the sea, and connected with the adjoining shipping place by a railway of about two miles in length, constructed by the present proprietor, the quarry is of an excellent quality, and has been used in several of the South Wales Iron-Works. The ground is held upon a long lease, at a low royalty, and is comprised of two farms, of about eighty acres each—the freehold of one of which may be now purchased. In the present opening, which is on the side of a hill, and worked by open cast, there is a perpendicular face of ironstone, of about fifty feet, the thickness of which will increase to upwards of 100 feet as the workings proceed up the hill. The rock under foot (the surface of which is on a level with the railway) contains to all appearance an inexhaustible bed of ironstone. The present opening is capable of producing 40,000 tons per annum, at a cost of 2s. per ton, including shipping the ore and every other expense.

A level has been already commenced (and which may be finished in a few months, at a trifling cost), leading from the railway to another portion of the ground, where an equal, or a larger, quantity of ironstone, of a similar quality, may be raised at the same low rate.

To ironmasters, to capitalists who require investment, or to persons desirous of forming a lucrative concern under the management of a joint-stock company, these works present every inducement for the outlay of capital.

For further particulars apply to Messrs. Williams and Bruce, 3, Lombury; or to George Howland, Esq., 3, Norfolk-street, Strand, London.

**TO MINE AND SLATE QUARRY ADVENTURERS.**

TO BE DISPOSED OF, BY PRIVATE TREATY, THREE-FOURTHS OF THE MINING INTEREST IN THE BENALLT MINERAL DISTRICT, CARNARVONSHIRE, adjoining the celebrated copper mines of Dwy-y-Coed and Simid-y-Dyllan. The lease extends over 640 acres of land, for the usual term of years, with 1-12th royalty. One of the many mineral veins has been cut by an adit level, 110 yards long, at a considerable outlay; the course is three feet broad, intersected with copper, mundle, black jack, and lead ore; another adit can be driven at another perpendicular depth of 300 feet, to cut the same course, if judged advisable. The adventurers, principally small tradesmen, in order to make an efficient trial, and to give a person of moderate capital the ruling part, offer the above shares at the nominal value of the outlay. The mines are situated seven miles from the shipping port of Carnarvon, and one mile from the railway leading thereto. Also a Blue Slate Quarry, situated 4 miles from the above port, and a range (at about two miles more westerly) of the immense slate vein of T. A. Smith, Esq.

Terms of the lease three lives and fifty-one concurrent years; the royalty only 1-9th of the net profit. Such favourable terms and opportunity have rarely occurred.

For particulars apply to Messrs. Jones and Hughes, Bangor Slate Wharf, Fimlins, London; Messrs. Jones and Pritchard, Carnarvon, North Wales; or to Henry English, Esq., 5, Shorter's-court, Throgmorton-street, London.

**THE PATENT GALVANISED IRON COMPANY** beg leave to announce to the public, that they are prepared to SUPPLY ROOFING, SHIP SHEATHING, AND FASTENINGS, CHAINS, and the endless variety of articles to which iron, not subject to rust, may be applied.—Testimonials may be seen by application at the office, 3, Mansion House-place, London.

**CAUTION.—THE PATENT GALVANISED IRON COMPANY** having ascertained that certain PARTIES are INFRINGING THEIR PATENT by the MANUFACTURE and SALE of a SPURIOUS and COUNTERFEIT ARTICLE, to the injury of the company and the detriment of the public, hereby give NOTICE, that this COMPANY have the SOLE PRIVILEGE of manufacturing and selling IRON COATED WITH ZINC, commonly called "Galvanised Iron," and that they will inflict the utmost PENALTIES of the law upon all PERSONS MANUFACTURING or SELLING the same without their authority, as well as upon all persons buying or using any Galvanised Iron not manufactured by them, or sold by their authority.

3, Mansion House-place, London, Jan. 24, 1845.

**CONTRACT FOR CHAIN.—THE COMMITTEE** of the REGENT'S CANAL COMPANY are ready to RECEIVE TENDERS for the supply of ONE THOUSAND TWO HUNDRED LINEAL YARDS of 11-16th best assorted, close short-linked CHAIN, at the CHURCH ROAD BASIN.—Tenders to be delivered at this office not later than Twelve o'clock on the 30th inst. EDMUND L. SNEE, Secretary, Regent's Canal Office, City-road Basin, April 17, 1845.

**PENZANCE NEW PIER.—TO CONTRACTORS AND OTHERS.**—THE TOWN COUNCIL OF PENZANCE having determined, under the provisions of their recent Act of Parliament, to IMPROVE THE PIER, by the extension of an ARM from the eastern entrance of the town southerly—a distance of about 1600 ft., of which 1400 feet will be beyond the intended terminus of the West Cornwall Railway, are desirous of RECEIVING TENDERS for the performance of the WORK, which should be completed within two years. The parties contracting will be required to enter into sufficient securities for the due execution of their contracts.

Drawings, specifications, and working plans, may be inspected at the house of Mr. John Matthews, Alverton-terrace, Penzance, the clerk of the works, until Six o'clock in the evening of Friday, the 16th day of May next, after which no tenders will be received.

Parties disposed to undertake this work, should send sealed tenders to the Town Clerk, endorsed "Tenders for the New Pier." Such tenders will be taken into consideration the same evening by the Quay Committee, and the party whose offer may be approved will have notice thereof soon after.

Any further information may be obtained on application to GEO. D. JOHN, Town Clerk, Dated Penzance, April 15, 1845.

**STEAM-ENGINES, from 8 to 16-horse power, ALWAYS in STOCK.**—Apply to Mr. Copper, engineer and ironfounder, Birmingham. Price.....£12 per horse. N.B.—CASTINGS AND FIT WORK MADE TO ORDER.

**WANTED, A HIGH-PRESSURE STEAM-ENGINE,** of from 30 to 35-horse power, with BOILERS, and all complete.—Address, stating particulars and price, to Messrs. Rennie and Co., contractors, Newport, Monmouthshire.

**A PATENT FOR SALE.**—This PATENT is for an IMPROVED METHOD in the GENERATING OF STEAM and the EVAPORATING OF FLUIDS. Most valuable properties in its rapid and almost instantaneous action—most astonishing saving in fuel—the total prevention of the boiler bursting, and the very material reduction in the weight of metal and space it occupies. It has the approbation of the most eminent engineers.—For particulars apply to Mark Bernard, Esq., solicitor, Southampton-street, Covent-garden.

**SUSPENSION BRIDGES.—ANDREW SMITH'S PATENT** GALVANISED WIRE ROPE AND CHAIN SUSPENSION, or PARABOLIC TENSION, BRIDGES, are so constructed that the lateral oscillation and vibration (so destructive on the ordinary suspension principle) are entirely prevented by this improvement. For deep ravines or cuttings, the Parabolic Tension Bridge costs much less than those on the suspension principle—piers, &c., being entirely dispensed with. Drawings and models may be seen, and all necessary information had, on application at the office, White Lion-court, Cornhill; 69, Princess-street, Leicester-square; or at the works, Millwall, Poplar.

**SIR W. BURNETT'S PATENT.—THE CHEAPEST AND BEST PROCESS** for the PRESERVATION OF TIMBER, CANVAS, CORDAGE, COTTON, WOOLLEN, &c.—LICENSES GRANTED TO NOBLEMEN AND GENTLEMEN to use the preparation; and to others, for the purposes of trade, on advantageous terms. HYDRAULIC APPARATUS AND TANKS.

For the expeditions preparation of the above materials, at the principal station, MILLWALL, POPLAR, nearly opposite Greenwich.

Numerous SPECIMENS and TESTIMONIALS may be seen, and every information obtained, at the office, 53, King William street, London-bridge.

**RAILWAY WHEELS.**—Two years' very extensive experience has demonstrated that T. BANKS'S PATENT MODE OF RENEWING THE WORKING SURFACE OF WHEEL TIRES, with STEEL, effects a SAVING OF FIFTY PER CENT. of the expense of railway wheel tires above any other plan hitherto used.

For TERMS OF LICENSE for England, Scotland, and Ireland, apply to T. BANKS, ENGINEER, GERMAN-STREET, MANCHESTER.

The following firms have taken Licenses to Steel Wheels in their respective localities: Messrs. Robert Stephenson and Co., engineers, Newcastle-on-Tyne; Messrs. Swaine and Novell, engineers, Millwall, Poplar, London; Messrs. Kilton, Thompson, and Co., engineers, Leeds.

**TO ENGINEERS, RAILWAY CONTRACTORS, MINING AGENTS, IRONMASTERS, AND OTHERS REQUIRING FINE GREASE** for MACHINERY and AXLES of every description.—JOSEPH PERCIVAL'S IMPROVED ANTI-FRICTION GREASE is—after trials on machinery and axles of every kind where constant friction is kept up—admitted to be the most useful, economical, and best in the market.

References to scientific and practical men can be given, and testimonials shown, of its great excellence.—Samples forwarded on application at the manufactory, Green-street, Wellington-street, Blackfriars-road, London.

**THE PATENT SAFETY FUSE,** FOR BLASTING ROCKS IN MINES, QUARRIES, AND FOR SUBMARINE OPERATIONS.—This article affords the SAFEST, CHEAPEST, and MOST EXPEDIENT MODE of effecting this very hazardous operation. From many testimonials to its usefulness with which the manufacturers have been favoured from every part of the kingdom, they select the following letter, recently received from John Taylor, Esq., F.R.S., &c.:—"I am very glad to hear that your recommendations have been of any service to me; and I am quite willing that you should employ my name as evidence of this."

Manufactured and sold by the Patentees, RICKFORD, SMITH, and DAVEY, of Exeter, Cornwall.

**PATENT IMPROVEMENTS IN CHRONOMETERS.** WATCHES, AND CLOCKS.—E. J. DENT, 43, Strand, and 33, Cockspur-street, watch and clock maker, BY APPOINTMENT, to the Queen and His Royal Highness Prince Albert, begs to acquaint the public, that the manufacture of his chronometers, watches, and clocks, is secured by three separate patents, respectively granted in 1846, 1848, and 1849. Silver lever watches, jewelled in four holes, 6s. each; in gold cases, from 25 to 210s. each. Gold horizontal watches, with gold dials, from 8s. to 12s. each.

DENT'S PATENT DIPLIODESCOPE, or meridian instrument, is now ready for delivery. Pamphlets containing a description and directions for its use 1s. each, but to customers gratis.

**OFFICE FOR PATENTS, 7, STAPLE INN, HOLBORN.** J. MURDOCH (successor and assistant to Mr. Hubert) informs INVENTORS and PATENTERS, that at his OFFICE they can obtain

REFERENCE TO A CLASSIFIED LIST OF PATENTS, THE ONLY ONE EXISTING, which shows at one view all the Patents ever granted for any particular object, whereby they may save much trouble and expense, and procure information not otherwise obtainable. BRITISH AND FOREIGN PATENTS OBTAINED, AND USEFUL AND ORNAMENTAL DESIGNS REGISTERED.

SPECIFICATIONS carefully prepared, and REPORTS OF ENROLLED SPECIFICATIONS furnished on moderate terms.

FINISHED AND WORKING DRAWINGS executed with accuracy and despatch.

**TO ENGINEERS, RAILWAY CONTRACTORS, &c.—THE** PATENT RIVET COMPANY OF SCOTLAND, 35, BROWN STREET, Glasgow, MANUFACTURE (under the superintendence of the acting partner, Mr. Alexander G. Gilchrist) all descriptions of BOILERS and TANK RIVETS, WOOD SCREWS, SCREW BOLTS AND NUTS, RAILWAY SPIKES, &c.

Orders executed with despatch, and forwarded to all parts of the United Kingdom.

**SEYSEL ASPHALTE COMPANY.—CLARIDGE'S** PATENT.—Established 1839.

This Asphalt is a Marseilles Manufacture, obtained from an inexhaustible mine at Pignat, in the French mountains. Ever since its introduction into this country, in 1838, the material has been used for many years in France, and, from its great utility, has been extensively patronised by the Government of that country.

Among the various uses to which it can be applied, the following may be enumerated:—For foot-pavements, public and others; in the carriage approach to mansions, garden-walks, and terraces; the flooring of kitchens and other basement offices; also of coach-houses and stables, dog-kennels, barn-droos, cow-houses, pigsties, poultry-houses, run-rooms, and mailings. For roofing, covering of railroad and other arches, the lining of underground cellars near rivers, to prevent the ingress of the water; also in covering the ground line of walls, to prevent damp rising (the application of the Asphalt of Seyssel is particularly recommended by the Commissioners of the Fine Arts), thereby rendering the basement stories in the worst situations both dry and warm. It is an excellent cement, as applied to docks, breakwaters, or walls requiring resistance to the encroachments of the sea.

For lining of tanks, fish-ponds, and other hydraulic purposes.

For the purpose of rendering the surface of the sea, or of the bottom of harbours, smooth and safe for navigation.

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**RYE AND THOMAS, MINE AGENTS AND DEALERS** IN STOCKS, RAILWAY AND OTHER SHARES, 86, OLD BROAD-STREET, LONDON.

ESTABLISHED 1834. MR. W. FORDYCE, SHAREBROKER, 15, GREY-STREET, NEWCASTLE-ON-TYNE.

**MINING RECORD OFFICE, 5, SHORTER'S-COURT,** THROGMORTON-STREET.—The business of this office not being confined to the purchase or sale of shares in mines, railways, and other undertakings, but open to negotiations as relates to mineral property, as also the appointment of practical agents to inspect and report thereon, Mr. HENRY ENGLISH will be happy to communicate personally, or otherwise, with parties who may wish to dispose of any mineral tracts, or desirous of investing capital.—Office hours Ten till Five.

5, Shorter's-court, City, April 26, 1845.

**WANTED, A SITUATION,** by a married man, as COL- LIERY VIEWER, or MINERAL AGENT. The advertiser is well acquainted with surveying and mapping. Satisfactory reference as to character and ability may be had.—Letters addressed to "A. B.," at the office of the Mining Journal, Railway and Commercial Gazette, 25, Fleet-street, London, will meet attention.

**ANGLO-MEXICAN MINT OFFICE, No. 5, Broad-street,** buildings, London, April 25, 1845.—Notice is hereby given, that the ANNUAL GENERAL MEETING of the shareholders in the Anglo-Mexican Mint Company will be HELD at this office on Tuesday, the 6th May next.—The chair will be taken at 9 o'clock precisely.

G. B. LONSDALE, Secretary.

**UNITED HILLS MINE COMPANY, 25th April, 1845.**

Notice is hereby given, that the scripholders of this company, intending to take NEW SHARES, pursuant to the resolutions of the special general meeting of the company, held on the 24th day of April last, must deposit their scrip share in the office of the company, No. 5, Adam's-court, Broad-street, on or before the 19th of May next, and pay the sum of £3 5s. for each new share allotted to them on or before the 14th day of the said month of May, otherwise they will forfeit their right to have such new shares.

Every shareholder will be entitled to one new share for every five scrip shares so deposited and paid upon.

By order of the board, JAMES SMITH, Secretary.

**NISTER-DALE IRON COMPANY.**

Registered pursuant to Act of 7 and 8, Vict., cap. 110. Capital £100,000, in 4000 shares, of 25s. each.—Deposits 2s. per share.

**BOARD OF DIRECTORS:** Julian Skrine, Esq., Lanesfield, Cambridge; Colonel John Newbery, Hereford-street, Cumberland-gate; John Holdship, Esq., Upper Bedford-place; S. P. Pratt, Esq., F.R.S., Lincoln's Inn-fields; William Hopkins, Esq., F.R.S., Cambridge; Dr. Fenwick Skrimshire, Peterborough; Henry Scale, Esq., of the Aberdare Iron-Works, Merthyr Tydvil—Managing Director.

**MANAGER AT NISTER-DALE—H. E. Fripp, Esq.**

**AUDITORS—D. T. Ansted, Esq., F.R.S.; John Freeman, Esq., BANKERS—London and Westminster Bank, Lombury.**

**SOLICITOR—George Hume, Esq., Great James-street, Bedford-row.**

This company had its origin in the high protective duties, which in many cases amount to an absolute prohibition, imposed by the German Zollverein upon the importation of every description of foreign iron. For this purpose, extensive iron-works for the manufacture of railway iron, bars, sheet-iron, nail rods, and other kinds of wrought-iron have already been erected, in the valley of the Nister, near the town of Hachenburg, in the Duchy of Nassau. Every care has been bestowed upon the construction of the buildings, which, it may be truly asserted, have no parallel in magnitude or design within the range of the German Union; and nearly the whole of the machinery, has been fabricated in England.

The company has acquired the possession of valuable mines of iron ore and coal, which are situated in the immediate vicinity of the works. The quality of some of the iron ore is equal to those of Sweden, and can be converted into pig-iron of a very superior description. The company is about to erect blast-furnaces, but as the puddling forge and rolling mills are now ready to work, and the demand for wrought-iron throughout Germany being immediate and remunerative, it is proposed to supply them for the present from the produce of the neighbouring furnaces. The excellence of the German pig-iron, is well known. The highly profitable manufacture of iron plate, wire, &c., for which the company's works are fully adequate, is also in early contemplation.

Considering the advantages which the company possesses in its machinery, its locality, and its raw materials, and also in the cheap labour which it can command, it is estimated that the various kinds of wrought-iron produced at its works, will not exceed their cost in any of the countries excluded from the Union. As the marketable value of iron in Germany is enhanced beyond that in those countries by nearly the amount of the protective duties, the company cannot but be enabled to derive a large return on the capital expended in the various processes of its manufacture. The extent of the return may be inferred from the existing prices of iron in Germany and the protective duties; and also from the present high prices of iron in England, and the probability (which has been stated upon the best authority), that the demand for iron in Great Britain will be equal to this "make," independently of the export trade, for some years to come.

From estimates in the possession of the directors, it is shown that the present contentment of the directors will return a profit of upwards of 10 per cent. upon the capital already subscribed; and when the smelting-furnaces are in operation, an addition of 5 per cent. may be relied upon—thus realising a net profit of 15 per cent. upon the entire capital invested in the works.

The demand for the several kinds of iron which the company propose to manufacture is indicated by the existing prices; and by the fact, that, in spite of the high protective duties, and of the heavy cost of transport, the States of the Union are compelled to import large quantities of pig, bar, sheet, and hoop-iron to supply their increasing consumption. This importation will be necessarily augmented with the rapid extension of railways in Germany.

The number of native markets which are now open to the company will be greatly enlarged by the projected line of railway from Cologne to Frankfurt, which will traverse the valley of the Nister, and approach within a few miles of the company's works.

A communication will thus be opened on the one side with Cologne, the terminus of the Berlin, Rheinisch, Dutch, and Belgian lines (and by means of the latter with the French railways), and on the other with the Wiesbaden and Frankfurt, Strasbourg, and Baden Railways, and the various lines which are either in the course of construction or in immediate prospect.

The company having been recognised by the Government of Nassau as a Société Anonyme (Anonymous Society), the responsibility of the shareholders, so far as respects all the liabilities incurred in the Duchy, is limited to the amount of their respective shares.

A deposit of £3 per share is payable upon allotment.

The first instalment of £3 per share will be payable within two months after the allotment, and no future instalment is to exceed 40s. per share. The period at which the remaining instalments are to become payable will be determined by the board of directors; but an interval of two months will elapse between each payment.

A limited number of shares only remain to be allotted, for which application, according to the annexed form, must be addressed to the directors, at the offices of the company, No. 10, Old Jewry-chambers; where prospectuses and forms of application for shares may be had.—London, April 17th.

**FORM OF APPLICATION.**

To the Directors of the Nister-Dale Iron Company.

Gentlemen,—I request you will insert my name as a subscriber for shares, of £35 each, upon the conditions of the prospectus, dated 17th day of April, 1845; and I hereby undertake to accept the same, or any less number of shares which you may allot to me, to pay the deposit, and sign the required deed when I shall be called upon to do so.

Dated this \_\_\_\_\_ day of \_\_\_\_\_ 1845.

Name.....

Residence.....

Profession or trade.....

Reference.....

**SOUTH METROPOLITAN PURE WATER COMPANY.**

REGISTERED PROVISIONALLY.

Applicants for shares and the public are hereby informed that the provisional committee have considered it desirable to POSTPONE the APPLICATION to PARLIAMENT for a BILL until next session, measures being taken to insure its due prosecution. A new prospectus will shortly be ready for delivery. In the mean time information may be obtained of the solicitors, Messrs. Birch and Bramah, 6, Great Winchester-street.

By order of the committee, JOHN GALSWORDTHY, 19, Ely-place.

**ROYAL ADELAIDE GALLERY, LOWTHER ARCADE,** STRAND.—This popular place of scientific amusement having passed into fresh hands, is now opened for alteration and repair, but will be RE-OPENED on Monday, May 5, with (among other novelties) a WORKING MODEL of FIBEROW'S ATMOSPHERIC RAILWAY, 100 feet long, and capable of conveying grown-up persons; also a Model of Phillips's Immature (shown in action), for throwing a great body of water in cases of fire; the magnificent Pyroscopie (twenty feet in diameter); popular lectures in science, the gas microscope, dissolving views, &c., daily. Admission, One Shilling; Schools, Half Price.

**NOTICE TO INVENTORS.—OFFICE FOR PATENTS** OF INVENTIONS AND REGISTRATIONS OF DESIGNS, 14, LINCOLN'S INN-FIELDS.—The printed INSTRUCTIONS gratis, and every information upon the subject of PROTECTION for INVENTIONS, signed by Lord R. Russell, and signed by Lord R. Russell, may be had by applying personally, or by letter, pre-paid, to Mr. Alexander Ritchie, at the office, 14, Lincoln's Inn-Fields.

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**WELSH MIDLAND RAILWAY AND THE SHREWSBURY AND HEREFORD RAILWAY.**—An arrangement has been made between the promoters of the WELSH MIDLAND RAILWAY, and the promoters of the SHREWSBURY AND HEREFORD RAILWAY, in connection with the SHREWSBURY, OSWESTRY, AND CHESTER JUNCTION RAILWAY, and the NORTH WALES MINERAL RAILWAY, whereby a railway communication between Leominster and Shrewsbury has been agreed to be made by a separate company, to be called the "SHREWSBURY AND HEREFORDSHIRE COMPANY," upon terms mutually advantageous.

**BARKER, ROSE, AND NORTON**, Solicitors to the Welsh Midland Railway Company.  
**H. KELSALL**, Solicitor to the Shrewsbury, Oswestry, and Chester Junction Railway Company.

**PROVISIONALLY REGISTERED.**  
**WELSH MIDLAND RAILWAY, TO CONNECT BIRMINGHAM AND THE MUMBERS ROADSTAD, IN THE BAY OF SWANSEA.**

And to communicate either by the Main Line or by Branches with WORCESTER, LEOMINSTER, LUDLOW, SHREWSBURY, HEREFORD, THE HAY, BRECON, LLANDOVERY, LLANDILO, (With a Branch to the present Terminus of the Llanelly Railway) LLANELLY, SWANSEA, AND CARMARTHEN.

Capital £4,000,000, in 80,000 shares, of £50 each.—Deposit, £2 10s. per share.

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Llandovery and Llandovery—Messrs. David Jones and Co.  
Swansea and Neath—The Glamorganshire Banking Co.

#### THE OBJECTS OF THE RAILWAY ARE—

To connect the manufacturing districts and the seaports of South Wales, in the Bristol Channel, with the great manufacturing districts of Staffordshire, and, necessarily, with the whole of the midland and other railways of the kingdom; thus making the best communication between the great mineral districts of Staffordshire, the salt district of Worcestershire, the manufacturing districts of Lancashire, Yorkshire, Westmoreshire, Warwickshire, and Nottinghamshire, and the seaport of Liverpool, with South Wales and the numerous works located in its mineral field, the most extensive of any in Great Britain.  
To afford to the whole of South Wales, and to a large portion of North Wales and to Herefordshire, as well as to the southern parts of Devonshire, the shortest railway communication with the midland and northern parts of Great Britain, and, to a certain extent, with London; as the Welsh Midland Railway must, at no distant period, become connected by important branches with the whole of the manufacturing districts of Monmouthshire and Glamorganshire, and the seaports of Newport, Cardiff (by the Taff Vale Railway), Neath, and Llanelly.  
To open at Swansea, which ranks among the ten first ports of Great Britain for the tonnage and value of its exports and imports, an outlet for the manufactures of the midland and northern counties, Swansea being within 124 miles by railway from Birmingham, and a port easy of access and possessing an excellent roadstead at the Mumbles, which must eventually become an important steam-packet station, being only separated 19 miles from Llanabon, and 160 miles from Waterford and the south of Ireland.  
To convey the iron, copper, and tin-plates and spelter, the chief articles of the manufactures of Staffordshire, by the shortest route to Stourport, Wolverhampton, Birmingham, and other places; and also metals and other produce to the port of Liverpool for export and for local consumption.  
It will afford the shortest communication by above fifty miles between the south of Ireland and the midland and northern parts of England and Scotland, thereby securing the passenger traffic, as well as all description of produce destined for those districts.  
To open out the agricultural counties of Hereford, Worcester, Gloucester, Radnor, Brecon, Cardigan, Carmarthen, and parts of North Wales, to the supplies of coal, lime, and metals from South Wales, Staffordshire, and Shropshire, whilst in return the agricultural produce of these districts will have ready admission into the densely populated manufacturing districts at either end. The Welsh farmers breed cattle very extensively, and it has been ascertained that 20,000 have passed yearly through the town of Llandovery alone, on their way to Lincolnshire, and the other grazing counties of England.  
The line of country to be opened by the Welsh Midland Railway appears especially noticed in the report of the Joint Committee of the London, Worcester, and Walsingham, and on the Birmingham and Shrewsbury districts, subsequent to a memorial presented by the promoters of this railway. It is set forth as essential to these great districts in such report in the following terms:—"The accommodation of Herefordshire, Worcestershire, South Wales, and the important districts lying to the west of the present lines of railway, will evidently, at no distant period, require not only a wide gauge railway along the southern coast, to place them in communication with London, but also a narrow gauge railway to place them in direct and unbroken communication through Birmingham, with the manufacturing districts, and the great railway system of the rest of the kingdom."  
It having been deemed advisable to extend the branch original "terminating at Ludlow, from that place to Shrewsbury, a proportionate addition has been made to the capital and number of shares. This portion of the line, coming to the terminus of the Chester, Wrexham, and Shrewsbury Railways, will thereby form a direct communication from South Wales, through North Wales, with Liverpool, Manchester, and the rising port of Birkenhead; and it is believed that parties in those districts will furnish an amount of capital quite equal to the amount required for this extension.  
A preliminary survey and sections of the whole line has been made, and satisfactorily establish that good and easy gradients will be obtained.  
Power will be taken in the bill to allow interest at 4 per cent. per annum on all deposits and calls from the time of payment until the opening of the line.  
Applications for shares may be made to the solicitors and local agents, of whom prospectuses and plans may be obtained.  
To the Provisional Committee of the Welsh Midland Railway Company:  
Gentlemen,—I request that you will allot me shares in the above company, and I hereby undertake to accept such shares as may be allotted to me, and to pay the deposit thereon, and also to execute the Parliamentary contract and the subscribers' agreement when required.—Dated this day of May, 1845.  
I am, Gentlemen, your obedient servant,  
Name .....  
Address .....  
Profession or Trade .....  
Reference .....

**WELSH MIDLAND RAILWAY.**—Notice is hereby given, that NO FURTHER APPLICATIONS FOR SHARES will be received, except from parties locally interested, and that such applications must be made on or before the 31st of May.

**DOMESTIC CHEMISTRY.**—Dr. Ryan is now going through a course of most interesting lectures, at the Royal Polytechnic Institution, on domestic chemistry. Having dwelt upon the importance of ventilation, the doctrines of heat and light, as applicable to the common concerns of life, the talented lecturer has, in his more recent lectures, considered the chemistry of the table. In his lecture on Thursday last, he gave the chemistry of the breakfast table with most effect; Dr. Ryan commenced, by stating that Dean Swift remarked "that so great was the extent of modern epicurism, that the world had to be encompassed before a washerwoman could sit down to breakfast"—nor is this exaggerated, as the learned lecturer proved the formation of this our most simple and economical meal requires no ordinary preparation. To use his own words, "upon a table formed of the rare woods of Honduras is spread the snow-white damask of our own land—before us is placed the beautiful ware of China or of Staffordshire, and the lustrous salvers dug from the bowels of some distant land—to gratify our palates we have the fragrant tea-leaf from the Celestial Empire; aromatic coffee berry from the heights of Mocha, Ceylon, Berberice, and St. Domingo; nor is to be forgotten the luscious produce of the sugar cane of the West Indian colonies—thus, to supply the breakfast-table, art and ingenuity must be taxed, the labour of men must be exercised, and perils by land and sea must be encountered." On each of these topics the doctor dwelt with much effect—from the bleaching of the damask table-cloth to the laws of heat developed during the maceration of a cup of tea. The audience, who at the commencement seemed to expect merely the common-placed topics of the breakfast-table, were delighted to find that so simple a meal was made the vehicle of scientific instruction in the most delightful and interesting form.

#### THE ELECTRIC TELEGRAPH—COOKE AND WHEATSTONE PATENT.

The ELECTRIC TELEGRAPH has been adopted for the following LINES:—  
BY ORDER OF THE LORDS OF THE ADMIRALTY, on the South-Western Railway, as a GOVERNMENT TELEGRAPH from the ADMIRALTY, Whitehall, to PORTSMOUTH, above TWENTY MILES.

On the same line, as a Commercial Telegraph from Nine Elms to the Port of Southampton, 77 miles—with a branch to Gosport, 15 miles.  
On the London and Blackwall Railway.  
Great Western Railway, from London to Slough, 18 miles—the Windsor Telegraph.  
Yarmouth and Norwich Railway, a "Single Way," 20 miles.  
London and Dover Railway, from Tunbridge to Maidstone, a "Single Way," 18 miles.  
Part of the Oldham Branch Railway.  
Part of the Leeds and Manchester Railway.  
Part of the Edinburgh and Glasgow Railway.  
The Dalkey (atmospheric) branch of the Dublin and Kingstown Railway.  
London and Birmingham Railway—viz., from Northampton to Peterborough—a "Single Line," 47 miles.

In addition to the above, the Telegraph is about to be laid down on several "single lines" in different parts of England, Scotland, and Ireland.  
Mr. Cooke is prepared to grant licences for the use or erection of the Telegraph for entire districts of country, where the boundary can be accurately defined.  
Mr. Cooke will also undertake to erect a Telegraph in any part of the United Kingdom for a fixed amount.

For further particulars apply to W. Fothergill Cooke, Esq., Kidderminster, Blackheath; or to Robert Wilson, Esq., solicitor, 1, Copthall-buildings, London.

#### STEAM TO INDIA VIA EGYPT, MALTA, ITALY, ALEXANDRIA, AND THE PENINSULAR PORTS.

##### PASSAGE TO BOMBAY, MADRAS, AND CALCUTTA.

The Peninsular and Oriental Steam Navigation Company BOOK PASSENGERS for CEYLON, MADRAS, AND CALCUTTA direct, by steamers leaving Southampton on the 30th, and for Alexandria, en route to Bombay, on the 1st of every month.  
A steamer from Southampton leaves the 1st and 20th of every month for Malta, whence are steamers to Naples, Genoa, Civita Vecchia, three times a month.

**STEAM TO CORUNNA, OPORTO, VIGO, LISBON, CADIZ, AND GIBRALTAR.**

A steamer leaves Southampton on the 7th, 17th, and 27th of every month.  
Apply at the Peninsular and Oriental Steam Navigation Company's offices, 51, St. Mary Axe, London, where only passages can be secured throughout.

#### BY HER MAJESTY'S ROYAL LETTERS PATENT.

**SMART'S ELLIPTICAL CONVEX METALLIC FLOATS,** FOR STEAM-SHIPS, as applied to the Bristol and Dublin steamer *SHAMROCK*, and to the *SWIFT*, between Newport and Bristol; and also to the *OSPREY*, running between Bristol and Waterford. The patentee has now the satisfaction to announce, that, in addition to the ships already named, he has granted a LICENSE to the Bristol General Steam Navigation Company to USE his PATENT FLOAT in all their steam-ships, comprising the *Dublin*, *Cork*, *Waterford*, and the various channel port steamers, varying in power from forty horses to two hundred each.

The numerous ADVANTAGES attending this valuable invention may be seen below:

1. The appearance of these floats is light and elegant.
2. Their durability and stability are indisputable, as may be instanced by the *Shamrock* steamer, which has been fitted with them for nearly twelve months, and has since steamed twenty-five thousand miles. The floats are now as firm and good as they were the first day.
3. Vibration is reduced so as to be scarcely perceptible; thus, the engines are eased, and both they and the ship suffer less wear and tear; and, from their peculiar form, they are strikingly advantageous in cases of strong head wind and heavy sea. Backwater and undulation is also reduced to its smallest quantum, and thereby lessening the chance of accident to small boats, barges, &c., which has hitherto been consequent on the operation of the common paddle-boat, particularly in crowded rivers.
4. They more readily arrest the progress of a ship in chances of a collision, the concave side taking the water when this operation is performed. This is of great importance in preventing collisions, or backing off a shore.
5. They are very simple, and are easily applied to any paddle-wheel, at nearly the same cost as the common float, and THEY INCREASE THE SPEED MORE THAN ONE KNOT PER HOUR.

For license to use them (for which the charge is 10s. per horse-power), apply to the patentee, Mr. ROBERT SMART, 5, Grenville-place, Hotwells, Bristol, who will personally attend the fitting, if required, his travelling expenses being paid.

#### AGENTS.

Messrs. George Lunell and Co., engineers and shipbuilders, Bristol.  
W. J. Le Feuvre, Esq., Southampton.  
J. N. Smart, Esq., Swansea.  
Thomas Mowatt, Esq., engineer, Leith, near Edinburgh.  
Scott, Sinclair, and Co., Glasgow.  
W. H. Hutchinson, Esq., Hull.  
J. R. Pin, Esq., Dublin and Liverpool.  
Jukes, Coulson, and Co., 12, Clement's-lane, London.  
\* \* \* Testimonials of the highest order, on application to the patentee or his agents.  
Bristol, December, 1844.

#### PATENT GALVANISED IRON COMPANY.—CAUTION.

—This PATENT was decided by the Jury, in the case of Patterson v. Holland, tried in the Court of Common Pleas, at Westminster, on the 12th, 13th, and 14th of February last, to be INVALID.

#### BY HER MAJESTY'S ROYAL LETTERS PATENT.

**MOREWOOD AND ROGER'S PATENT METAL.**—This article was at first sold under the name of Galvanised Tin Plates, but the patentees finding that the public, in some instances, overlooking the word Tin, confounded the article with Galvanised Iron, and that the character of their metal has thereby sustained injury, are desirous of giving it a name so distinctive as to prevent such mistakes, and consequent disappointment to purchasers, in future. They, therefore, respectfully request purchasers to inquire for Morewood and Roger's Patent Metal. In order to enable the public readily and at first sight to distinguish between the two metals, it may be well to inform them, that Galvanised Iron has a plain zinc-like appearance, while Mr. R. and R.'s Patent Metal has a smooth crystalline surface.

Patronised by the Admiralty and the Honourable Board of Ordnance, being extensively used in her Majesty's Dockyards, at the Tower, the extensive new fire proof warehouses of the Liverpool Dock, and elsewhere, for every variety of roofing, and other purposes, where a strong, light, cheap, and durable material is required.

It has been found by experience, that this article is beyond all comparison superior to zinc; possessing, as it does, all the advantages arising from the strength and firmness of iron, combined with perfect immunity from rust; it is free from the very serious injury, as is zinc, to its contraction and expansion, consequent upon every change of temperature, and from which circumstance leakage must of course result. This material is not likely to be destroyed by fire, as is the case with zinc and lead which melt and run down, thus freely admitting fresh air to the fire, and causing it to burn more fiercely. It is, therefore, obviously well adapted for all the purposes above-named, and most importantly so, when there is the possibility of fire. It is also peculiarly suitable for chimney-tops, gutters, spouting, and out-door work generally, possessing the strength of iron, without its liability to corrosion. It is by far the most economical metal roofing that can be obtained, in consequence of its strength, as it may be laid without boards, and upon the lightest rafters.

This mode of preserving metal from rust does not only apply to sheet-iron, but also to manufactured iron in any form, as bolts, nuts, hinges, nails, &c., &c.  
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Age.	One Year.	Seven Years.	Whole Life.
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30	1 2 0	23 3 3	22 1 1
40	1 5 6	27 6 6	22 6 4
50	1 15 9	31 6 6	22 11 1
60	3 3 5	317 0	6 8 3

Full particulars are detailed in the prospectus.

A. R. IRVINE, Managing Director.







## ENGLISH AND FOREIGN STOCKS.

STOCK EXCHANGE, Saturday morning, Twelve o'clock.	
Canada, Money, 95 1/2	Spanish, 5 per Cents, 30 1/2
ditto, Account, 95 1/2	ditto, 3 per Cents, 40 1/2
Exchequer Bills, 95 1/2	Brazil, 5 per Cents, 88 1/2
Belgian, 5 per Cents, 100 1/2	Chili, 5 per Cents, 98 1/2
Danish, 5 per Cents, 99 1/2	Colombia, 5 per Cents, 100 1/2
Dutch, 5 per Cents, 99 1/2	Mexican, 5 per Cents, 37 1/2
ditto, 4 per Cents, 97 1/2	Peru, 5 per Cents, 31 1/2
Portuguese, Conv., 5 per Cents, 65 1/2	

**LEEDS, Thursday.**—Our local stocks—West Yorks at 88s. pm., Thirsk at 49s., Dewsbury at 61s., and Huddersfield and Manchester at 90s. pm.—have all improved during the week, but in other stocks a decided reaction is apparent, and shares come on the market; in our opinion this depression will be merely temporary, the abundance of money and the goodness of trade being sufficiently powerful to produce a speedy re-action. Midlands are quiet at 166s. per share; there can be no doubt that this company is in a much better position than it was three months ago; its claims have been recognised by the Board of Trade, and the 100 to 150 miles of extension lines, which will, probably, be constructed, must ultimately bring an immense accession of traffic upon the trunk railway. Independence of the augmentation which may reasonably be expected of the present receipts of the old line, under these circumstances we shall not be too sanguine. If we anticipate that the Midland, in the course of next year, may pay 8 per cent., and the year after 9 or even 10 per cent., and in this case, even at present prices, the Midland stock is still one of the cheapest in the market for investment. York and North Midlands, at 100s., are very low at their present rate of dividend, as they pay 5 per cent. on the present market price, and there is no fear of any diminution for some years to come at least. But, on the contrary, a great likelihood of permanence, if not of considerable increase. There is some hitch in the arrangement of the lease of the Manchester and Birmingham to the London and Birmingham Company, and some of the shareholders, though at the last meeting the terms were agreed to almost without a dissentient voice, appear now to be resolved to resist the completion of the contract; the result of this uncertainty has been a fall of 2s. to 3s. on the price of the shares; our own opinion has not altered as to the prospective advantages which, in any event, must accrue to the Manchester and Birmingham, and at 88s. per share, we confidently recommend them, as we did at 50s., or last week when at 60s. The meeting of the Midland Company will enlighten the public as to the merits of the Erewash Valley shares, which still stand at 10s. Hull and Selby are much as before; the old stand at 105s., and the halves at 23s.; the shareholders, we fancy, will hardly be so unwise as to refuse the offer of Mr. Hudson, for the sake of the vague promises of the directors, who now talk largely of the advantages of independence, but would still gladly pin the concern to the skirt of the Manchester and Leeds, on terms not half so favourable as those which they wish the proprietors to stultify themselves by rejecting.

## MEETINGS OF SCIENTIFIC BODIES DURING THE WEEK.

SOCIETY.	PLACE OF MEETING.	DAY.	HOUR.
Royal Botanical	Regent's Park	Saturday	8 P.M.
Geographical	Waterloo-place	Monday	8 P.M.
British Architects	16, Grosvenor-street	Monday	8 P.M.
Civil Engineers	20, Great George-street	Tuesday	8 P.M.
Zoological	11, Hanover-square	Tuesday	8 P.M.
Society of Arts	Adelphi	Wednesday	8 P.M.
Geological	Somerset House	Wednesday	8 P.M.
Antiquaries	Somerset House	Thursday	3 P.M.
Royal Institution	Albany-street	Friday	8 P.M.
Botanical	Bedford-st.	Friday	8 P.M.

## MEETINGS OF PUBLIC COMPANIES DURING THE WEEK.

DAY.	COMPANY.	PLACE OF MEETING.
Monday	Blackburn and Preston Railway Company	at Blackburn
Tuesday	Clarence Railway Company, at One.	
Wednesday	Whit St. Clair Mining Company, at Twelve o'clock	
Thursday	Mexican Mining Company, at One—European Gas Company, at Two—Grand Junction Railway, at One—Vauxhall Bridge Company, at One.	
Friday	Assam Company, at Twelve for One—Hull and Selby Railway, at Twelve.	
Saturday	Manchester, Bolton, and Bury Railway Company	

## NOTICES TO CORRESPONDENTS.

The sale of Bluen Ford's Watch, advertised to take place on the 28th inst., is postponed until the Auction Duty finally ceases. Due notice will be given of the day on which the sale will take place.

A pressure of advertisements at a late hour has interfered very much with our arrangements, and compels us to postpone much of our usual statistical and other matter.

THE MINING JOURNAL.  
Railway and Commercial Gazette.

LONDON, APRIL 26, 1845.

We have from time to time noticed the advance in the iron trade, and with pleasure announced the improvement—recording, as far as lay in our power, the several and progressive alterations, whereby the ironmaster might look forward to be reimbursed the serious losses to which he has been subjected during the past few years, while it affords him the means of increasing the wages of the collier, the miner, and those employed in the works. We have had the gratifying pleasure of stating, on more than one occasion, the advance in wages—for never are we more delighted than in announcing the prosperity and welfare of the working miner—such, however, have, in our opinion, now reached a healthy point, while any increase, we feel assured, would be attended with evil.

We have, for the past several weeks, recorded the rise in price in iron, while we have, in common with many others, considered it too rapid to be permanent. When we reflect that pig-iron was selling in the Clyde at 35s. per ton, which is now quoted at 51. 10s. to 6l.—that bars were sold at 4l. 5s., now quoted at 10l. to 11l., it may very well be imagined, that the ironmasters must be doing a good "trade" at present prices, if that they could "live" before. But it appears, from the course taken within the past few days by some of the principal parties interested in the "trade," that, in their opinion, the price is too high, and hence their determination to reduce the price of bars, which, we are informed on good authority, has been settled at 40s. per ton, with the intention of a further reduction, so as to put a stop to excessive prices, wages, and, further, the rivalry which is naturally expected from new works being established, and old works resumed. Our impression is, that the demand for iron, although it may cover the next two or three years, is not such as to warrant the advance in price, and that some folks will, if they mind not, "burn their fingers." Some of the Welsh ironmasters are progressing at a railroad pace—they can afford to do so with present prices; but let them take care that they do not destroy themselves.

The Government measure, as promulgated last night in Parliament by Sir ROBERT PEEL regarding the Banking System in Scotland, must seriously affect the iron trade of that country, and will, doubtless, lead to a fall in prices. The subject is one of so much importance, that we shall next week devote more space than we can now afford, while its influence on our national resources, as well as appliances, more particularly at the present moment, with reference to railways, will not only be recognised, but, doubtless, attract the attention of those interested in the iron trade.

If the present be not the "iron age," of which we have been told, it must certainly be admitted as the "railway era," approximating, as nearly as possible, to that which we presume was contemplated by the ancients. Whichever way we look, railways, we find, are stretching forth their iron arms, and grasping in their embrace kingdoms, which they would unite by a kindred spirit of action. Railways and electric telegraphs may be said to be fast annihilating space and time, and what will be the terminus, remains to be seen—while the members of the "house" (the Stock Exchange), doubtless, wish that there may be no end to speculations, which, like the present, however, they may promise to the capitalist, are, at least, pretty sure, in the way of profit, to those who avail themselves of the "market."

Let us, however, leave to some "Daniel" of the nineteenth century, to propound the results, while we, as in duty bound, record the passing events of this busy year. Railways are daily being brought forward—some without hopes of success, others of a nature which excite only a feeling of surprise, that districts, holding out so many prospective advantages, should have been so long neglected; however, we believe, attention is now so far directed to the subject, and the advantages attendant on railway communication so generally admitted, that we may contemplate a general system throughout the country. It is not alone the economy of money, but that of time, which forms one of the many features in railway travelling.

Six hours will now convey the traveller from London to Liverpool, which, by the fastest conveyance, previously occupied twenty-four hours, or four times that now engaged in the journey. Again, to Exeter, in like manner, the distance of 180 miles by rail is accomplished in five hours—and thus it is, that time and space, become, as it were, within our grasp.

We must not, however, indulge in rhapsody; but, for a moment, see what is doing abroad, and it is not surprising to find, that even the plethoric Germans appear to be wide awake to the movement, and actually are seeing for themselves, if we may judge by a prospectus inserted in the *Frankfort Journal*, now before us, the substance of which, had time or space admitted, we would have submitted to our readers, but to which we will endeavour to give insertion in our next. The formation of an English company, for working iron mines in Germany, the prospectus of which appears in our columns, also affords evidence that "speculation is rife," and, as far as our experience goes, as well as personal inquiries, with reference to that country, not without good prospects. We shall endeavour to collect some material on this subject for next week, when we may enter further into detail.

We have not space to direct attention, as we could wish, to the subject of the application of funds arising from mine clubs, adverted to by a correspondent, whose letter appears in our columns of to-day, but we may assure him that we have not lost sight of the "Widow and Orphans' Fund," to which we shall revert in an early Number. We regret to say, that we have not received the support we anticipated, for, whatever has been achieved in forwarding the measure, has been at much cost, to which we will not more immediately refer. We have, however, our reward, if even unsuccessful in our endeavours—yet, it shames us to think, that we represent an interest, which, with the exception of those who kindly promised their support, on our last visit to the county, displays so general a want of proper feeling and sympathy.

It is with regret, at all times, that we refer to the conduct of individuals, but, more especially is it, when we have occasion to advert to any circumstance calculated to reflect on parties, whose position in society, as well as connection with the mining interests of Cornwall, should claim our esteem, and, at the same time, disarm those who would allow suspicion to attach to the principles or motives, which might be supposed to influence their actions.

The case to which we refer, can, however, admit of no question, as to the propriety—nay, even, we may say, the necessity—imposed on us of exposure; while our columns, we need hardly add, are open to any explanation which can be afforded by the gentleman, who is not only charged with dereliction of duty, but whose conduct, as a banker, a smelter, and a miner, would appear calculated to reflect discredit on the county.

Let us, however, see how the case stands; while we leave to our readers to form their own conclusions. The mines of Stray Park and Camborne Veau, in the vicinity of Camborne, have been worked extensively, and many tens of thousands, if not hundreds, embarked in carrying on the adventure; or, rather, we ought perhaps to say, expended in the course of its working. The mine immediately contiguous is that of Wheal Francis, formerly in the possession of the late Capt. THOMAS TEAGUE, and since his demise, held by his executors—the lease of which has just terminated. Mr. HUMPHRY WILLYAMS, the gentleman referred to, is, we find, a member of the committee of management of the Stray Park and Camborne Veau Mines, and naturally may be supposed anxious to promote the interests of those who have committed their property to his care, and would, therefore, use his best endeavours to obtain for the body of adventurers he represents, the additional tract of ground, or set adjoining the mines in which their capital is embarked—that of Wheal Francis. All this, it is only natural to assume, would be the case, and our readers, or the majority, would, doubtless, arrive at such conclusions; but what is the fact? Mr. HUMPHRY WILLYAMS, a gentleman whose probity and character is too well known in Cornwall to render at all necessary our meed of praise, considering, it appears, that the Cornish motto of "One and All" might fairly be constructed as meaning "one" for all—or, as a friend at our elbow suggests, "all" for one—has taken to himself the Wheal Francis sett, which is held from Lady BASSETT, and, we think, her ladyship, or even her steward or "toller," Mr. VIVIAN ROBINSON, can hardly know the circumstances, or they would never have granted the sett to Mr. WILLYAMS, to the prejudice of the adventurers in the adjacent mine.

Simply as we can, we will endeavour to give the data on which we ground our charge against Mr. HUMPHRY WILLYAMS. It is this:—The Stray Park adventurers have been carrying on their operations, with, if not the promise, at least the understanding, that the adjoining sett would be added to that already possessed by them, on the lease expiring, or on its abandonment by the executors of the late Capt. TEAGUE; and, accordingly, their workings have been, in a great measure, directed (successfully, it would appear,) towards the western boundary—indeed, within some sixty fathoms of Wheal Francis—in effecting which a cost of, say 300l. to 400l. a year, has for the past two or three years been incurred, to the benefit of Wheal Francis, or, rather, that mine has been so far relieved. The 150 fathom level, the workings to which we have referred, is advanced, so as to give a value to the Wheal Francis sett, which we have heard estimated at some 8000l. or 10,000l.: this, however, may be a matter of doubt, as it is of opinion, but whether it be worth one shilling or one hundred thousand pounds, the fact is still the same—Mr. HUMPHRY WILLYAMS has taken to himself a property, which virtually, if our information be correct, ought to have belonged to the adventurers of Stray Park; and this he has done, while he possessed the confidence of the parties, and professed to be their servant. We consider that all directors, or members of a committee, are servants, for they are empowered to act for their co-adventurers—they are as delegates from the body, and, in most cases (we know not whether it applies in the present instance) receive remuneration for the services (?) they render. But it would appear, that Mr. HUMPHRY WILLYAMS merely used his post or office of committee man, as DAN would, to any measure—that of rendering it the stepping-stone to a something else. We are sorry to speak thus harsh of a gentleman, who is so generally respected, but, in so doing, it will be a lesson to others, that whatever may be their position in society, they cannot act with impunity, where honour be not the basis, without rendering themselves subject to public animadversion.

We have more than once adverted to the projects of railway enterprise, relating more immediately to Spain, and, among others, to that of the Royal North of Spain, which has taken the lead, so far as English capitalists are concerned—while, by the Madrid papers, it would appear to be held high in estimation there, judging from the prices quoted. We are not, therefore, surprised to find other lines projected, or companies formed, with the object of making branch lines, or dividing Spain into sections, which will, doubtless, be again subdivided. "The Central of Spain Railway," which has been lately projected, is, perhaps, one of the most legitimate schemes brought forward, being supported by parties possessing capital, and, we believe, interest. That Spain holds out more than ordinary advantages to the capitalist, no doubt can be entertained—while we may express our conviction on the assurance of parties in whom we can repose every confidence, that capital may not only be safely employed, but so as to yield a large return in the formation of railways in that country. There can be no doubt but that there is much capital in Spain, but then it is in private hands; they possess not the means of employment, as afforded in this

country, and there is neither the enterprise nor confidence which we possess, in any degree manifested. With the union of English capitalists, they appear well disposed to embark in enterprises of this nature, and thus advance the interests of their nation; and, although we would rather keep our capital at home, we are well pleased to find a union of interests existing between England and Spain.

We have already referred to two of the leading lines projected—that of the Royal North of Spain, from Aviles to Madrid, as also that of the Central of Spain Railway. The prospectus of the latter is not yet out; but we have every reason to believe, not only that the project presents prospective returns, which must be satisfactory, but that the undertaking will be ushered forth under the best auspices. We wish we could say as much of other undertakings; however, it is for our readers to investigate for themselves, while they will do well, in more than one instance, to "mark, learn, and inwardly digest."

## PROGRESS OF RAILWAYS.

Nothing can be more conclusive of the steady advance of railways, and the increasing favour which they meet from the public, than an unbiased review of their relative receipts for merchandise and passengers, during two or more distinct periods. As the census of a nation portrays at once its progress or decline, and the wealth of its commerce, as either enhanced or depreciated, so the statistics of a national undertaking may fairly be consulted as a criterion of its success. It is in taking the comparative increase of our several lines, that we have, from time to time, presented a cheering account of the present position and future favourable prospects of railways generally, and we now furnish a few succinct and plain statements, respecting the progress of one line, not in itself of any great importance, as connected with enormous traffic, or immense through communication, but one of the minor projects, whose revenues are unaided by any impulse, but that of steady and sterling utility, and, therefore, a more satisfactory test of the general value of similar undertakings. The Chester and Birkenhead Railway has a total number 17,500 shares, 5000 being original, at a price of 50l., and issued at par; 5000 half-shares at 25s. each, issued at 20s.; and 7500 new 50l. shares, issued at 17l. The first are now in the market, at somewhat a shade better than par; the second at a premium of 4l., and the last are quoted at no less than 44l. We will now consider how far the success of the undertaking has hitherto warranted this favourable quotation. From the 1st of January to the 30th June, 1843, the number of passengers on the line had been 99,782, paying an amount of 99,151. 10s. 9d. From the 1st January to the 30th June, 1844, the number of passengers had been 126,055, and the amount paid by them, 113,417. 5s. 7d., being an increase in the six months of 26,273 passengers, and 14,265. 5s. 10d. During the latter period, the capital account presented an amount of disbursements of no less than 518,989l., including 135,792l. for land and compensation, 209,957l. for works on roads, and nearly 200,000l. more for Parliamentary, law, and engineering expenses; and while the revenue account showed a further disbursement of 8782l. 9s. 8d. for various incidental expenses. To meet these heavy preliminary disbursements, 514,885l. 18s. was raised by calls on the three several classes of shares, by mortgages, premiums, and loans, and a deduction of 21,318l. 5s. being made from the debit account for the sale of lands, old materials, and for the discharge of a turnpike bond, the original expenditure was reduced to 497,671l. 9s. 4d.—leaving 16,914l. 8s. 8d. in favour of the company, on the capital account, and 5415l. 16s. 6d. on the revenue account. Out of this a dividend was declared of 8s. 6d. per 50l. share, and 4s. 3d. per 25l. share; but 5s. 3d. being due on each of the new 50l. shares, the amount paid was only 3s. 3d. per share, requiring a sum of 4406l. 5s., which was deducted from the surplus, left a balance in hand of 1109l. 11s. 6d. Such was the position of the company on the 30th of June, 1844, having, for the half-year then first ended, carried 126,055 passengers, receiving an amount of 113,417. From that date, to the 30th of January, 1845, the number of passengers had been 147,618, being an increase of 21,563, and an amount of 13,019l. 9s. 2d.; being also an increase of nearly 2000l. The merchandise for that half-year had realised 1684l. 10s. 6d., and the mails, 406l. 7s., presenting a total receipt of 15,109l. 17s. 8d. For the corresponding period in 1843, the number of passengers had been 99,121, 240l. the amount for them, 11,094l. 8s. 6d.; merchandise, 1164l. 11s. 11d.; mails, 283l. 9s. 6d.—in all, 12,542l. 9s. 11d.—showing an increase of 2567l. 7s. 9d. on the total receipts. To the amount of 15,109l. 17s. 8d., is also to be added 81l. 3s. 5d. for rents, &c.; giving a gross receipt of 15,191l. 1s. 1d., while the expenses, being only 8284l. 18s. 7d., as presented, with the balance of the preceding half-year, a surplus of 7833l. 3s. 4d. in favour of the company. Of this balance, 5906l. 5s. has been allotted for the payment of interest, being at the rate of 10s. per 50l. share, and 5s. per 25l. share. We have given these statistics in detail, because they present a very useful illustration of the advantages of the system, as contrasted with its preliminary difficulties, eventually overcoming them, and gradually, but steadily and satisfactorily, evidencing prospects of permanent future success.

**PROGRESS OF IRON SHIP-BUILDING.**—On Wednesday last, the iron ship-building yard of Messrs. Thomas Vernon and Co., North-shore, Liverpool, was the scene of much bustle and excitement, in consequence of the launch of two iron steamers, which have been constructed, one for the Prussian service, and the other for the Emperor of Russia. A large concourse of spectators attended to witness the ceremony, and all passed off with the most complete gratification. The *Preussischer Adler* was the first launched, immediately after which the *Wladimir* was ushered in a grand style into its native element. These steam-vessels are the same in construction, and constructed almost on the same lines: their length is 185 feet; breadth of beam, 29 feet; depth of hold, 17 feet 6 inches; and tonnage, 749; the whole of the deck-beams and side-frames are constructed with Kennedy and Vernon's patent iron. At a cold collation, to which about three hundred ladies and gentlemen sat down after the launch had taken place, Mr. T. A. Vernon, who was in the chair, made some very interesting remarks respecting iron ship-building. He stated it to be an art, at present, but comparatively little known, and one which had presented innumerable difficulties; it required a most perfect union of scientific theory with sound practical knowledge; he had never witnessed success by the builder, who depended too much on theory; or, on the other hand, by the mere practical man, without sound scientific knowledge; for want of this desirable combination, a number of very inferior iron vessels had been constructed, but they were now improving rapidly. "It is with much pleasure we are enabled to state, that the whole of the standing rigging of these vessels will be composed of Andrew Smith's patent wire rope—another proof of the estimation in which its qualities are held—an opinion founded on the result of many years' experience under every variety of circumstances, in all parts of the world, the result of which has proved it incontrovertibly to possess in a most eminent degree, extreme durability, great strength, and the most undoubted economy."

**METALS AND METALLIC PROPERTIES.**—Professor Faraday delivered, on Saturday last, his second lecture on Metals and Metallic Properties, at the Royal Institution, Albemarle-street. The subject of the lecture was chiefly confined to the discussion of the properties of copper, which were satisfactorily illustrated by a series of very interesting and beautiful experiments. Its extreme ductility was ably dilated on, and proved by the learned lecturer, who also showed that as its thickness was diminished, its strength became increased; and that its tenacity was, under such circumstances, so much augmented, that a weight which could not be lifted at all by it in its unattenuated state, was raised with facility, when suspended from the elongated wire. Its malleability, though, of course, very inferior to that of gold, was stated to be, nevertheless, very considerable; thus affording a ready acquisition to the manufacturer and artist, in the fabrication of bronze and other admixed metallic works. Its peculiar properties, as a magnetic conductor, and its powers, when under the influence of electricity, were very beautifully illustrated, especially in its comparison with other metals, and the action they relatively experienced. The learned professor concluded his lecture, by evidencing the extreme utility and value of its capability of pulverisation; proving its applicability to the fine arts, by performing a number of successful experiments, and showing, in particular, the mode of ornamenting paper, and other light articles, effected merely by the assistance of varnish, and the finest pulverised metal. The lecture was, as previously, listened to with intense interest, by a numerous and very fashionable audience.



## A GLANCE AT CORNISH MINING—No. I.

BY JOSEPH VELLOXY WATSON, ESQ.

(Revised by the author for the Mining Journal, from the Railway Register.)

Although the principal mining operations of the present day are confined to Cornwall, we do not find that any mines were worked in this county for copper, prior to the seventeenth century: whilst it would appear that copper was first introduced in Great Britain during its occupation by the Romans: the Parys Mountain, in Anglesea, being the spot where it was first discovered. In the thirteenth century, Cumberland was the only part of Great Britain productive of copper, of which there are any records. At Newlands, near Keswick, some rich veins of copper were wrought about the year 1250, as appears from the Close Rolls of Henry III. Camden says of these copper works, "that they were not only sufficient for all England, but great quantities of copper were exported every year." It appears also from a charter granted to Keswick by Edward IV., about A.D. 1470, that that place was then famous for copper works. Some of these works were again opened in Camden's time, and his commentator adds, "the works were destroyed, and the miners killed in the civil wars." In the reigns of Henry VIII. and Edward VI. we find that several Acts of Parliament were passed, prohibiting the exportation of brass, copper, latten, bell-metal, gun-metal, &c., under a penalty of forfeiting double the value of the quantity exported. The reason given being "lest there should not be metal enough left in the kingdom fit for making of guns, and other engines of war, nor for household utensils." The Rammelsberg Mine, near Goslar, in Lower Saxony, is supposed to be the oldest in Europe productive for copper, the history of which has been traced as early as the tenth century. The annual produce of copper ore in Cornwall from 1726 to 1735, Pryce informs us, exceeded 6,000 tons. The first public sale on record of copper ores in Cornwall, was in 1729, when 2215 tons 15 cwt. were sold for the year. In 1820, the sale was 91,473 tons. In the year ending June, 1844, the quantity was 152,667 tons; and this brings us to the object of this paper—to look on mining as it now is. There are at the present time upwards of 200 mines at work in the counties of Cornwall and Devon. About 150 of these are worked for copper, the rest for tin and for silver-lead. The principal districts for copper are the Gwennap, the Camborne, and the Eastern or Caradon; but until within the last five or six years, very few mines are worked to any extent, out of the Gwennap and Camborne districts, though the eastern mines now rival, if not surpass, the others. The principal tin mines are in St. Just, and St. Ives; the lead mines, in Newlyn and St. Columb, and also, further east, upon the borders of Devonshire. Taking the average cost of working these 200 mines at 600l. per month each mine, we shall find the enormous sum of 1,440,000l. annually expended in mining operations, principally for materials, such as iron, timber, coals, candles, tools for workmen, gunpowder, &c., &c., and for labour; for the latter alone it is supposed 1,000,000l. are annually paid; the mining districts giving employment to upwards of 100,000 individuals. The limits of the different mines are generally marked out by large stones, placed at certain distances on the surface; and, considering that many of the mines immediately adjoin each other, and the bounds are only marked out above, it is astonishing how few instances occur of the miners employed in one set, breaking through their limits into the set of their neighbours. Miners have been compared to moles, but there is something more than blind instinct here. When a party of miners, called in Cornwall "adventurers," obtain the grant of a piece of ground to work as a mine, they first ascertain, as near as possible, the situation and direction of the lodes, or veins of ore, which is generally done by costeaning, or sinking pits in different parts of the set; by this means the best situation is found for sinking, or in Cornish vernacular, "placing," the shaft; so as to take the run of all the lodes. The shaft is generally sunk about twenty or thirty fathoms, according to the nature of the ground, when a horizontal level or gallery, called an adit, is driven east and west, for the purpose of ventilating the mine, and for drawing off the water as the shaft gets deeper. At every ten fathoms the shaft is sunk, similar levels to the adit are driven east and west, these levels being subdivided by small winzes of about ten fathoms in height and sixteen fathoms apart. The object of the shaft and levels is to get at the ores, and put the lode into such a state, that it may be worked conveniently by a number of men. The ore, when broken from the lode, is wheeled in barrows along the levels to the shaft, and then drawn to the surface by the engine; and the winzes, beside communicating one level with another, ventilate the mine. The shaft is generally timbered for thirty fathoms in depth, sometimes the whole way; which depends on the nature of the ground; the timber used being Norway pine; and it is estimated that 30,000l. worth is annually used in the mines. The levels are generally three feet wide, and six or seven feet high. The shaft having been sunk in the manner described, the water is pumped out of the bottom levels, by means of an engine, into the adit, which carries it off, either into the nearest valley, or into the sea. The Great Cornish Adit, commenced in 1748, by an ancestor of the Messrs. Williams, of Scorrier, is the most extensive undertaking of the kind in England, perhaps in the world; and a description of it may not be uninteresting here. It commences in the Carnon Valley, and its longest branch extends to Cardew Mine, a distance of five miles and a half; one branch of it unwaters the Consolidated, the United, and other mines as far westward as Ting-tang; and two other branches extend different ways, unwatering several mines in their courses. The total length of its different branches is about thirty-five miles. At the shallowest part it is not more than twelve or fourteen fathoms deep. At Wheal Hope it is seventy fathoms from the surface; the average, however, is from thirty to forty fathoms. Allowing a tract of 200 fathoms in breadth outside its ramifications to be drained by it, the area it unwaters has been computed at nearly 5550 acres. It is supposed this adit saves in the article of fuel alone 30,000l. a year in the district it unwaters, as the additional steam-power that would be required to drain the water to the surface, which is now only drawn to the adit, and intercepted by it in its descent, would require an annual increase of 2500 tons of coal. The veins of copper occur in groups, and traverse an extent of several square miles; each group forming a mining district. They occur principally in clay slate, called "killas," and sometimes in granite, called "growan," intersected by a bastard granite, or porphyry, called "clvan." The portion of a lode next the surface, is generally composed of a brown soft substance called "gossan." A kindly, or, as the Cornish say, a "keenly" gossan giving great delight to the miner, as it denotes a favourable lode at a greater depth. Copper lodes run east and west, lead lodes north and south; and there are copper courses running nearly north and south, chiefly composed of quartz, called by the miners, "flookan." These cross-courses, running across the lodes, often heave them considerably, as much, sometimes, as twenty or thirty fathoms. A lode in a mine called Wheal Peever, was heaved by a cross vein fifty fathoms from its regular course, and was not found again until after a search of forty years; and a singular instance of this sort occurred in the Consolidated Mines, where a lode was heaved seven feet by a flookan vein in cross-courses. Where the course course was first discovered, the copper vein contained a large rock of quartz, apparently unconnected with any other stone of a similar description, and the singularity of the fracture which this stone presented, induced the miners to pay particular attention to it; and on following the flookan about seven feet, the copper vein was again discovered, and at the point where it came in contact with the flookan, another quartz rock, similarly insulated, was found; and in digging out the rock carefully, it was found to fit the other exactly, leaving no doubt in the minds of those who saw them, that they had once been united.

The Consolidated Mines, in which this singular phenomenon occurred, are the most extensive in Cornwall, and worked by one company of proprietors. The workings extend sixty-three miles underground, or 55,000 fathoms, and there are eight large steam-engines, and about thirty small ones, employed in pumping out the water; raising the copper ore, &c., &c. The cost of working amounts to 5000l. per month, and the copper ore raised from the mine from 1819 to June, 1843, sold for 2,220,657l. The deepest shaft is 2100 feet from the surface of the earth, and 2000 persons are employed in the mines.

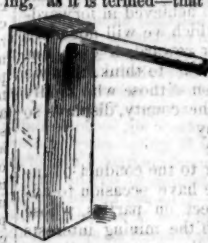
[To be continued in next week's Journal.]

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## NASMYTH'S PATENT STEAM HAMMER.

Having, on several occasions, directed attention to Mr. Nasmyth's novel and ingenious invention, it must be interesting to our readers to be informed of its rapid and most successful progress towards general adoption, and which, we are glad to find, is giving the very highest satisfaction to all the parties who have availed themselves of so powerful and useful an assistant. One of the hammers was put in operation for the first time in Scotland, on Monday week, at the Dundry Iron-Works, near Glasgow, and, as might have been expected, attracted a good deal of interest and public attention; its weight is nearly 2 tons 12 cwt., and the precision with which the patentee can direct, or control at will, the power necessary for making a slab of half a ton of iron, or cracking a nut of an inch circumference, of shingling a bloom of iron, or shutting the lid of a snuff box—in short, of simply touching, or actually crushing, anything "from a needle to an anchor"—is the most convincing proof that need be adduced of the adaptation and consequent importance of this patent steam hammer.

There are upwards of thirty now in action in various parts of Europe, all of which are giving the highest satisfaction, and more than realising the most sanguine hopes entertained of its practical value in facilitating the working of masses of wrought-iron, as well as materially improving its quality. In respect to this subject, it may be interesting to some of our readers to know, that "puddled balls," hammered under this machine, have the cinder so entirely driven out, as to yield at once a quality of iron at least advanced an entire process—that is to say, the result, as to quality, of this first stage in the manufacture of wrought-iron, is equal to that of the second—a fact that will be duly appreciated by those practically conversant with the manufacture of wrought-iron. The facilities of "up ending," as it is termed—that is, of turning a mass of iron on its end so, that the ends of the mass may be hammered compact and flat, as well as the sides—is rendered so simple and easy a process under this hammer, by reason of the great range of fall which can be commanded at pleasure, that it is an advantage which appears to be highly valued by the iron manufacturers, as the entire material of the mass is in this way rendered available, when rolled out into a bar or boiler-plate. In the process of piling or welding the slabs of iron which go to form large boiler-plates, the most important facilities are obtained from the use of the steam hammer, not only from the use of the steam hammer, but also by enabling the mass so produced to be turned upside ways, edge ways, and end ways, so as to be made into one compact rectangular mass—this being the natural result of the wide range of height of fall of the hammer, as well as the important fact of the hammer and anvil face being at all times parallel to each other. It is amusing to see the *hindy* way in which it puts a tender, spongy, puddled ball, and then, when it is ready and fit to receive a blow, to see the hammer "walk into it," in such style as to send the cinder squirting from its most inward recesses—the whole resulting in one compact neat mass of almost perfectly pure iron. But, when it is known, that Mr. Nasmyth has now in hand forty-eight steam hammers for various parts of Europe and America, such a fact speaks sufficiently well for its merits being appreciated.



only from the vast energy of the blows serving to knock out, in the welding, all cinder and scoria by a few masterly and truly effective blows, but also by enabling the mass so produced to be turned upside ways, edge ways, and end ways, so as to be made into one compact rectangular mass—this being the natural result of the wide range of height of fall of the hammer, as well as the important fact of the hammer and anvil face being at all times parallel to each other. It is amusing to see the *hindy* way in which it puts a tender, spongy, puddled ball, and then, when it is ready and fit to receive a blow, to see the hammer "walk into it," in such style as to send the cinder squirting from its most inward recesses—the whole resulting in one compact neat mass of almost perfectly pure iron. But, when it is known, that Mr. Nasmyth has now in hand forty-eight steam hammers for various parts of Europe and America, such a fact speaks sufficiently well for its merits being appreciated.

**THE HOT-BLAST DISCOVERY.**—(From a Correspondent.)—In addition to the remarks we made, in last week's *Mining Journal*, respecting the testimonial about being presented to Mr. Neilson, and also to the merits due to Mr. Condie, for his participation in the practical completion of that great discovery—the application of heated air to the smelting of iron—we have been requested, not only as an act of justice to Mr. Condie, but also to set the matter in a clear light before the public, to explain the subject further, and, as a preliminary announcement, may simply state, that what the invention of Watt was to the steam-engine, the invention of Condie is to the hot-blast. Prior to the experiments made with hot air in iron smelting, which were suggested by Mr. Neilson, it was a commonly received impression that cold air in place of hot air was an advantage to the process. Mr. Neilson commenced by having his air heated up to from eighty to ninety degrees of Fahrenheit. This was found an improvement, and the heat was gradually and always beneficially increased; each advance of heat giving a greater quantity and a better quality of metal from the furnace. At the highest and most advantageous heat for throwing air into the furnace, however, an almost insurmountable obstacle presented itself. The furnace wrought most advantageously for a short time, but owing to the immense heat at the point of contact between the air and the metal, the conveying pipe, or tube, melted, and gave way so rapidly, that greater loss was ultimately sustained by thus pursuing the process, than by the application of air at a lower heat. To overcome this, the new and bold idea presented itself to Mr. Condie, of having a stream of pure cold water carried through the centre of the tube, to keep it cool, and carried along so as neither to affect the heated air nor the furnace, within an inch or so of the molten mass. The effort was made. Twines were cast hollow, and so constructed that water led in-pipes by gravitation could be introduced into the centre of their noisil, and so led off, that a constant cooling stream was kept up. The experiment, on being tested, was found to succeed beyond expectation, and, in consequence, a new character was immediately given to the hot-blast process, and a new set of apparatus was most advantageously added to it, and these of a more complicated and foreign nature than even the changes and condensing apparatus introduced by the celebrated Watt, to the simple, comparatively ineffectual steam-engines previously invented by Newcomen. The simple facts are now before the trade and the world, and, it is to be hoped, that while Mr. Neilson is about receiving so handsome and well-merited a reward, the claims of one equally deserving, may not be altogether overlooked.

**NEW IRON-WORKS IN SCOTLAND.**—The estate of Oakley, which is about four miles distant from Dunfermline, situate between the parishes of Carnock and Torryburn, has been lately purchased by Mr. Allison, a very wealthy and public-spirited gentleman connected with the iron trade in the west country. It is his intention to work the minerals on the estate to the utmost extent, and he has also acquired a right to work the minerals in several adjacent estates. A survey has been made of the fields from Saline Hills to the sea coast, which are ascertained to abound with iron-stone, and he has already commenced operations. More than 120 fathoms of boring-rods have been cast at the foundries, here. From the ascertained quality and quantity of the iron ore in the district and from the wealth and enterprise of the proprietor, it is believed this will become the most extensive work of the kind in Fife. A new village on the estate of Oakley is also about to raise its head, connected with these works, of no mean dimensions. 200 houses have been already contracted for. They are all to be built uniform, and covered with slate—each house to have two apartments. We hear that a builder in town has contracted for these houses and furnaces for 22,000l. A survey the other day was made for a private railway connected with these works, from Oakley to the pier at Crombie Point. Many advantages are likely to accrue to the neighbourhood from these extensive works. No labourer in the district need be out of employment. The circulation of money and the extensive traffic is another consideration in favour of the projected railroad by Queensferry.—*Fifehire Journal*.

**VICTORIA IRON-WORKS.**—(From a Correspondent.)—I have the pleasure to announce that these extensive and most valuable works will shortly be in full and active operation, under favourable auspices. Mr. Griffiths, of Pontypool, to whom the repairs of one of the furnaces were entrusted, has completed the work in a short period and a creditable manner. On Saturday last, one of the furnaces was blown in, under the superintendence of Mr. Joshua Morgan, brother of the late Mr. John Morgan, whose skill and general success in the management of iron-works, gained for him so high a character in the trade. The furnace having been filled in the manner peculiar to the brothers was put in blast at 12 o'clock. In a very short space of time cinders came over the notch, and continued flowing freely and of excellent quality; the furnace working as though it had been in blast for months; until Monday morning, when it was stopped in the presence of a large concourse of persons, who had assembled to witness the interesting ceremony. Not less than eight tons of excellent dark grey iron flowed into the moulds prepared for its reception. The next cast, in fifteen hours' time, weighed six tons, and was smooth-seed open-grain foundry iron; and old experienced furnace managers, who were lookers on, pronounced it to be the most successful blown in they had ever witnessed. The whole proceedings reflected much credit on the management of James Beaumont, Esq., as upon the active superintendent, Mr. Morgan, whose accurate knowledge of workmen has enabled him to select the most competent in each department; and it may be truly said, that without such knowledge, scientific arrangements, as well as the most careful and assiduous superintendence, often fail. The workmen, by orders of Mr. Beaumont and other gentlemen present, were liberally supplied with refreshments.—*Monmouthshire Merlin*.

## Original Correspondence.

## THE ACCIDENT AT WEST MOOR COLLIERY.

Sir,—Again has death in its most appalling form suddenly appeared in one of the mines of the north—ten unfortunate human beings have been again destroyed by the fearful fire damp; and, again, have the officers of the mines solemnly sworn at the inquest, that the mine where it happened was the safest, the best ventilated of mines; and, again, has the jury, under the direction of the coroner, before all the bodies were found and the place of explosion could be reached, with a speed, defying investigation, given the stereotyped verdict of "Accidental Death." In this outline you behold the same features as the explosion at Wellington, at Haswell, at Cox-lodge, and all the late "accidents," as they are called—the best of arrangements, the fullest of ventilation, the safest of pits, yet abounding in death, but only "Accidental Death." There is this difference here, however, that the force of the coroner's inquest was not fully performed, it was hurried over with the indecent haste, as if they were committing crime, and feared that the public might become spectators. Before all the bodies were found, and the place of fire was reached—and, consequently, before the cause of the explosion could, by any possibility, be known—that jury and that coroner, on their oaths have solemnly averred, before Heaven, and in the name of their country, that these men have died an "Accidental Death," while they might have died by the criminal act of one of the sufferers, or by a criminal misarrangement, or neglect of means of safety, in the proprietors and viewers, for aught that they knew at the time of their verdict. How long is this to continue?—it cries shame upon the country, which permits such practices. There are ten people killed and buried like dogs, with as little care and as little ceremony—their miserable families in despair—their deaths horrid—their souls gone to an unprepared reckoning—and the men producing such results can calmly lay their heads upon their pillows, and soundly sleep; and their country, with humanity and religion on their ever-professing lips, can cold-bloodedly look on, and stir not, or utter no sound, to save the miserable victims. All this is to me inexpressibly horrible.

Let us look at the evidence. Robert Crooks swears "that the current of air was quite free and good; the air is so good (he says) that in some places the candles have to be sheltered by a piece of deal or plank, and it has always been considered a safe colliery." Joseph Bowman (the overman) swears that "that morning everything was in good order, and safe and well all the way, and that sometimes the air was so strong, as to cause the men to complain of the cold." John Wales (the under-viewer) deposes—"Every care is taken, and no expense spared to keep everything in perfect order for the safety of the men, in the pit."—How could it be doubted? In seeing this, do you not think you are re-perusing the evidence of Haswell. Might not all the trouble and expense they give themselves be spared, for it appears to have no effect? These accidents in these perfectly ventilated and safe mines, are even now more abundant than they were in the rough careless management of miners a century ago. This mine sworn to be so well ventilated, so safe—so very safe—blowing the men's candles out, is yet so peculiar in its safety that they are not content to work with candles, even in the whole coal working, but, with a surprising care—surpassing that of Haswell—use Davy lamps in the headways, where it was supposed to have fired. Here is the parallel complete between Haswell and West Moor. The two safest pits in the trade (except Cox-lodge) were, rendering assurance doubly sure, working with the safety lamp, amidst their tremendous ventilation—yet they explode! Notwithstanding, let me repeat the interesting fact, which the jury were sworn to investigate, they hasten, with an unholy speed, to declare the cause of this catastrophe "accidental." At present, says the under-viewer, "it is impossible to arrive at any opinion as to the cause of explosion; quite the contrary, say the jury, who were deciding by this evidence, "it was accidental." The headways are never considered dangerous to go into with candles (quoth this same authority), but we sometimes come to slips in the coal, and we use lamps on that account." That is, that they are not, and yet they are, dangerous, so they use lamps on that account. "Besides," adds this same person, who has several hundred lives committed daily to his care, "besides the current of air is so strong that candles could not be used"—so that, in a current which to blow out a candle must be five or six miles an hour, they use a Davy lamp, which passes the flame in a current of three miles an hour. The assurance of the managers of collieries, in conceiving that such gross absurdities are to be received, is very striking. How can a colliery, nearly a mile and a half in tye, with a current of air, they assert, blowing out candles, yet worked, contrary to all usage, with Davy lamps (and these Davy lamps known to pass the flame even in a sluggish current) be said to be in a safe well-managed condition? Yet, with such a series of self-contradictory assertions, the public are expected to be satisfied, and leave their fellow-beings in such hands for future immolation. There must soon be an end to all this. It is impossible that the country can longer tolerate it. Allow me, whilst I am writing, a few remarks on that curious production, *The Coalowners' Report*—they shall be brief. The whole document appears to be concocted for the purpose of warding off the threatened changes that are pending over the mines. There is a dark sleekness about it, too, that would cozen and deceive, and glide sinuously on its cruel course, that reminds one strongly of the purring cunning of the tiger upon its bloody errands.

The commissioners of Government, Messrs. Faraday and Lyell, who, with so little self-respect for their high names and responsibilities, were flattered and turned aside from their duties, by the affected deference, and respect, and one-sided views instilled into them, by the cunning men to whose guidance they were committed while in the North, have, however, received their merited deserts. Employed in impressing upon the Government and country erroneous views, with some crude speculations of their own, they have been ceremoniously dispatched. Not one point of their report has been sustained—except one, and that were the commissioners' ignorance, and the coalowners' self-interest, coincided. This report sustains Messrs. Mather's and Dunn's views on the cost and inefficiency of piping goaves—on the carbonic acid being left by their proposal in the mines—on the explosion invariably accruing, where no piping could be laid, in the whole coal working—on these heads this report seems to be a reiteration of those gentlemen's remarks. On the system and necessity for increase of ventilation, they differ from the former only because it is expensive, admitting fully its efficiency. On its expensiveness we will briefly join issue with them. In the meantime, let us look at a point or two of this curious production. They say, the High Main Colliery having been worked out, they have gone to the Bensham, one of the lowest in the series, and that this is the most efficient way of draining off the gas, letting it out where it most abounds; that is, exposing the men of this generation at once amongst the very concentrated fire damp, without any chance of draining, by working the upper seams. They prefer freely risking the men to day, to drain the gas, that some men of some future day may work the mines in safety. Humanely-calculating coalowners! courageously disinterested men! They will risk the safety daily of all their workmen, that future generations of pitmen may be safe. For their humanity and self-devotion, they deserve a monument erected to them—by posterity. Do I misrepresent? Hear themselves. "The Bensham seam, which is noted for the quantity of fire damp yielded by it, and in which the most calamitous explosions of the district have occurred, has since been extensively worked."—"As regards fire damp, the natural inference plainly is, that a coal-field is most efficiently drained of this most mischievous agent, by first working those portions of it where the gas is most abundant, that is, its deepest positions." Inferring, by thus working the Bensham and Hutton seams, they are doing their best to drain the coal-fields; they do not say, that if these coals were not the highest price at market, the draining of gas, and care of posterity, would have to be effected by some other means. When the High Main existed, they only worked that seam as being the best coal; now, when they cannot get it, they take the lowest and the most productive, and take credit to themselves for a system of draining, at the expense of the lives of their fellow-workmen. Is this not small cunning and great hypocrisy, playing on the ignorance of the commissioners and Government? Look at the two following extracts, put into juxtaposition, and draw your own inference:—"When they are reasoning against the admission of goaf pipes, because the goaves are not done, it is their interest to say, This is proved by the state of the upper beds of coal; a few fathoms above the lower bed, which has been already extracted. It is found that irregular subsidences have taken place, that the breaks in the strata are similar to small slip dykes, showing the subsidence of extensive areas at once." Having thus reasoned against piping goaves, they then reason the other way, when they do not want any interference with their working out all the finest and most profitable coal below, leaving the upper seams broken and of difficulty to work, and posterity, which they were so



anxious about a short time ago, regularly in the lurch. When the underlying bed is removed (they now say), it lowers a corresponding portion of the upper seam, but does not injure it materially, because the upper bed being entire, its disintegration is prevented, by the circumstance, that one portion of it supports and prevents the displacement of another.

That corresponds well with the "irregular subsidences," and "small slip-dykes" of the other extract. Coalowners, after all, though very deep in their remarks, are not naturally geniuses; it appears; nor will they, more than any one else, be allowed to make the same argument support two different opinions; nor will their two self-contradictory facts be allowed to do any thing but destroy their false views—like the Kilkenny cats, eating each other up, not even leaving a bit of a tail—and shake in doing so somewhat their official statement. A thing cannot be in two opposite states at the same time. The upper strata cannot be unaffected by working out the lower, and also be broken into small slip-dykes at the same time by the same process. The latter being the greatest annoyance, inconvenience, and injury, to coal working of almost any disposition of the strata and seams. These two opposite things cannot co-exist—they are a contradiction in terms. Besides the assertion, that no great displacement takes place in the upper seams from extraction of the lower, is unfounded in fact. Frequently the strata are broken to the very surface; for instance, the Jarroo pit has displaced the strata upwards for 120 fathoms, producing great fissures in the soil, and shaking the houses upon the surface. It was only the other day, too, that the Friar's Goose mine, by the sinking of the strata above its workings, rendered many houses uninhabitable at St. Peter's Quay, near Newcastle, and so also has the extraction of coal in the St. Hilda pit, 300 yards below South Shields, shook the buildings of that town; in fact, it may be stated, as an almost general rule, that the superincumbent strata and coal seams are more or less injured and displaced, wherever the coal below is worked out. Compare these facts with the coal owners' assertions, and draw your own conclusions.

Really, Sir, that very so production has received a great deal more attention than it has deserved; coming from practical men—deeply interested in the question I suppose—they expected something substantial, practical, clear, and correct, with facts undeniable, and reasoning comprehensive—what is it? In composition and style feeble and inexpressive—in sentiment low and fulsome—in thought and comprehension poor and weak—in nothing distinguished, but for its cunning, yet obvious, attempt to deceive the public and the Government; like the silly ostrich, with its head inserted in a hole, which thinks it cannot be perceived, so the brains of the coalowners similarly situated, they think the body of their designs are deep, removed, hidden, and unsearchable. Let us now see briefly what is their hostility to more shafts; they admit their advantages, but they object to their expense, and quote an instance or two where it was, doubtless, great, but from their own reckless mismanagement, as we shall see. These very brilliant reporters now quote themselves, on the cost of shaft sinking, from Messrs. Lyell and Faraday's report, which views they had too successfully instilled into these gentlemen when at Haswell; and they give us two instances—one Murton, another this notorious pit of Haswell. In doing so, however, they have only demonstrated their own usual want of practical care and precaution. Had the Murton and Haswell owners previously bored, they might, with even less penetration than is usually brought to bear upon the northern mines, have ascertained, at the cost of 100*l.* or 200*l.*, the condition of the subjacent strata; but, because other collieries had been successfully sunk in that district, they would at once put down a pit, and with avidity proceed direct to seize on the treasures below. We want no better proof than this report itself, to show that with a more careful and better digested arrangement, shafts may be sunk without great cost and difficulty. They could not at Haswell penetrate the quicksand, affording 4000 gallons of water per minute, but are driven from their position. They retire, however, only about 150 yards, and at once reach their royalty, without any difficulty, unusual cost, or meeting again this quicksand. It is so admitted even in their report, by their stating the first attempt to have been difficult—the other not so; and the facts are as I now state. This case, as well as that of Murton, only demonstrates incapacity and practical geological ignorance in these very candid autobiographical reporters. But, had these instances been inseparable in their attempts, they are only two exceptions to a great general rule—and exceptions, we all know, do not make such a rule, but only demonstrate its correctness. We will give them two other expensive exceptions, and, in doing so, have exhausted their whole defence on this point. Monkwearmouth Colliery, about 1500 feet deep, the deepest nearly in England, which cost also a large amount; and Dutton-le-Dale, where they were obliged to use engine-power of about 1270 horses (more than that at Murton), to sink their shafts. The first mine, we believe, they did not test by the bore rods, therefore it was an ill-considered speculation. In this latter case, however, be it spoken to the credit and honour of the proprietors, notwithstanding all their cost, so impressed were they with the necessity of shaft-room for ventilation, and their other operations, that here they put down, within 100 yards range, three shafts, two of them fourteen feet each in diameter, and one sixteen feet in diameter. Such men as the reporters from the Coal Trade Office would have shrunk from such a cost, have exaggerated the difficulty, and made it the reason for continuing to leave the mines infested with fire damp, and an excuse for wholesale destruction of life. But had these been all failures, or with costs absorbing the value of the whole produce, they cannot affect the fact of the general rule, that shafts are invariably sunk on an average in the northern district at 15*l.* to 16*l.* per fathom, exclusive of the pumping-engine, generally not over 250-horse power, worth about 5000*l.*, and afterwards required for the mine.

These four exceptions cannot be permitted to rule for about 120 collieries, sunk in the Northumberland and Durham district. Nothing would so clearly show the fallacy of the expense of shaft-sinking, as estimated by these gentlemen, than a Parliamentary return of the number of shafts in each colliery, the cost of sinking each shaft, and the extent of workings ventilated by each shaft. We hope the Government, Lord Ashley, Mr. Duncombe, or some other member, will move for such return: it is of vast consequence to the lives and healths of thousands, as well as the economy of the mines, and will bring out this only point deserving of attention for legislation. We are deeply convinced, and have good data for grounding that conviction, that the whole pits of the district will not average 15*l.* per fathom, or under 2500*l.* per shaft. (Mr. Mather states there are some cost under 10*l.* per fathom, and I know many that cost less.) If these costs had been so great, and had shafts not been so important, do you think Mr. Biddle (that able and careful viewer) would have sunk, as he did, at Wallsend, four shafts, for 130 acres of workings, 140 fathoms deep; or Mr. George Stephenson recommended two shafts invariably for the Newcastle coal-field, instead of one, for each mine, and proving his belief by sinking them, in Lancashire, 500 yards down, on the same principle? This report also endeavours to excuse the necessity of more shafts, by stating, that, by enlarging their air-courses below, and splitting their air, the full supply of the shaft will be brought into operation. This may be admitted; for, if the air-courses below, or the upcast, have not the capacity of the downcast, the air will be checked, in proportion to its restricted channels, taking into consideration its expansion below; but also the courses may be made larger than the downcast, which, as the downcast cannot supply air, will be wasting cost; or what it does supply may be so often split, that, by increased friction, and diffusion in many channels—like a river diffused in many beds—it may become sluggish, and almost stagnant, as was proved at Haswell, where the explosion occurred; for the air, being diffused there amongst five boards and nine headways, fell into a nearly stagnant current of sixteen feet per minute, and so the explosion.

This whole affair seems to be a very imbecile attempt, notwithstanding my Lord Londonderry's interested opinion, and (I speak it with respect) the Duke of Wellington's ignorant opinion of this production and its merits. The hasty remarks with which I have now troubled you, will do something to aid in drawing attention to some of its weak positions. Meanwhile the public may as well know its authors, that they may see its animus.

Mr. George Johnson (the chairman) is the person who is viewer at Wellington pit, which exploded in 1841, and killed thirty-two of his workmen; and who told the House of Commons, in 1835, that the same could not be drawn through the gauge of a Davy lamp by a tobacco-pipe, though any person may do it invariably sixty times an hour.

Mr. T. John Taylor, of Earsden (viewer) is the nephew of the chief proprietor at Haswell, and who took the general superintendence of the inquiry there, besides being physician-viewer to that mine—who, consequently, is on his defence in this report for ventilating 500 acres from one shaft, also to find good excuse for that "accident," and exonerate, if possible, those that are to come.

Mr. William Anderson, of South Shields, who works nearly the same number of acres at St. Hilda Pit, from a bratticed shaft, as is done at Haswell, and who, in 1839, lost fifty-two men and boys, besides horses,

in an explosion there. However, it may be said for this gentleman, that we have heard that he is heartily ashamed of the report, which, as being a sign of grace, we have nothing more to say, except that, in other respects, he is a very respectable man.

Mr. Nicholas Wood, the viewer at Killingworth, who has just lost ten of his people by an explosion at West Moor, and who is so scientific as to employ lamps where his candles are blown out, in a dangerous atmosphere, though a much less current passes the flame, both through a Stephenson and a Davy lamp;—and Mr. George Hunter, of whom we know nothing, good or evil, except that he is the Marquis of Londonderry's viewer, and committed the mistake at the Haswell inquiry, of stating that pit to be the best ventilated in the trade, when he had been under Biddle, at Wallsend, where he knew they had four times better ventilation.

Whether these men—their doings written with the hand of death amongst the northern mines—so interested, and placed on their defence, could admit anything, or suggest any advantageous change, the public can well judge. For me, I think the report is worthy of its authors.

Allow me to say, in conclusion, that the mining districts and the country, are much indebted to you, for the attention and public spirit which you have bestowed upon this nationally-important subject.

April 16.

A LOOKER-ON.

## EXPLOSIONS IN COAL MINES.

Sir,—Noticing in the newspapers an account of an explosion at Killingworth Colliery, and causing the death of ten persons (a comparatively small number, when compared with those of Felling, Wall's End, St. Hilda, and Haswell), nothing should be left untried for the immediate remedy of such awful and destructive calamities, allow me to make a few remarks on the most probable causes of such accidents, and their ultimate remedy. First, the want of a more powerful and uniform ventilation. Second, the use of a furnace at the top or bottom of the upcast shaft, which may be compared to a firebrand placed in the midst of an explosive and combustible substance, though, in some cases, the return drift passes into the upcast a considerable height above the furnace; carburetted hydrogen, intimately mixed with a due proportion of atmospheric air, becomes highly explosive, and, coming in contact with flame, will ignite—carrying death and destruction along with it. Third, the too much contracted area of the return and windroads, thereby increasing the friction to serious amount. The velocity of air, or other fluid bodies, being—1. for any known quantity through a given area—say, 24 feet, the specified time 30 seconds, the friction being 1—the same quantity of air passing through an aperture, the area of which is 12, in the same number of seconds the friction is increased to 4—consequently, to keep up the same ventilation, the size or area of grate bars in the furnace must be four times the area, and the consumption of fuel equal to that amount—when 1 would be sufficient were the area of windroad 24. Lastly, the direction of the wind, the barometric pressure of the atmosphere—the temperature of the air descending the downcast shaft rendering the two columns of air in the upcast and downcast shaft of nearly the same weight; at the same time the per centage of inflammable air, or "fire damp," being increased to a fearful extent. I could enumerate many other causes, but those already advanced ought to be considered sufficient, and were I to go through the whole of the philosophical reasonings connected with the subject, it would fill a thick octavo volume. The power of an ordinary furnace, consuming 18 cwt. of undressed small coal in twenty-four hours, and placed at the bottom of an upcast shaft of 100 fathoms, the barometer at 29.5, the uniform temperature of the downcast 60 deg. Fahr., area of windroad 18 feet, is exerting a force equal to half a horse-power only, and exhausting about 5000 cubic feet of air per minute. This is far too small a quantity for an extensive mine—Church Pit, Wall's End, at the time 101 were killed, had 5000 feet of air passing through the workings. To avoid all the difficulties connected with the ventilation of coal mines, and for insuring a more perfect, steady, uniform, and more powerful ventilation, I have never found any thing to answer the purpose so well as the application of mechanical force, which the subjoined testimonial will show—I have selected it from a number equally important; the apparatus can be applied to any mine, without the least hindrance or loss of time to either the proprietor or workmen—the ventilation increased to double the present amount (if required), and will not cost one-fourth of the expense that half the quantity of air does when ventilated by a furnace; the apparatus is its own indicator of the quantity of air delivered, and, with prudent attention, the mine may be kept perfectly free from explosion.

I have found some employers very regardless of the safety of the pitmen—for instance, on applying to a very eminent colliery owner, who knew the mode I wished to adopt at one of his pits, which was a very fiery one, he stated—"We shall be at no expense, if all our men were killed to-day we would fill our pits with fresh men to-morrow—there are plenty of colliers to get." Whilst making this statement, he did not consider his own interests; for, with an increased ventilation, not only the safety of the men is secured, but the workings are less liable to be injured from explosion—the pandon, or propwood, will be preserved longer from rotteness; indeed, the whole of the tackling, from the mouth of the downcast, along the workings to the summit of the upcast, will all be kept in a higher state of preservation. I must also add (which is a matter of great consideration with many), the danger of the horses being killed by explosion, will, in a great measure, be removed. I have now before me an account of the number of accidents which have occurred in the counties of Durham and Northumberland—the following synoptical table will show that the average number of lives lost in every explosion is 13; the total number from January 1743 to June 1835 inclusive, are as under: the accidents are classed as they have occurred in the month of any such year as they have happened, with the number of lives lost:—

Months.	Explosions.	Lives lost.	Months.	Explosions.	Lives lost.
January .....	2 .....	51	July .....	8 .....	69
February .....	3 .....	18	August .....	17 .....	67
March .....	1 .....	10	September .....	9 .....	95
April .....	7 .....	53	October .....	14 .....	201
May .....	7 .....	141	November .....	15 .....	153
June .....	10 .....	284	December .....	11 .....	105

Making a total of ninety-four accidents from explosions, with a fearful loss of life, to the amount of 1247. Humanity should prompt us to use every exertion to remedy such dreadful calamities, and not one point should be lost sight of that would tend to alleviate the sufferings and danger to which the operative pitmen are subject to. I leave those observations for your serious consideration, should they be suitable for the columns of your valuable and scientific Journal, you will confer on me a great obligation by inserting them.

St. James's-street, Leeds, April 21, 1845.

W. FOURNESS.

P.S.—The cost of a machine, inspecting erection, &c., would vary from 50*l.* to 140*l.*, the variation in price arising chiefly in the application of power; and, at the same time, should gladly furnish inquirers, with every information.

## [COPY OF TESTIMONIAL.]

Whitehaven, May 22, 1844.

MR. WILLIAM FOURNESS, Sir,—Your machine for ventilating mines having been in operation upon my new winning, at Wyndham Colliery, near this town, a sufficient length of time to test its efficacy, I have to make the following statement of the results. The mine, before the machine was applied, was ventilated by a furnace consuming 45 cwt. of small coal, in twenty-four hours exhausting 5700 cubic feet of air per minute. Since the machine has been applied our ventilation is more than doubled; and as the machine throws off 13,600 cubic feet per minute, it is our faith if we do not secure that quantity of air through the mine. The machine is driven by power, taken from our pumping-engine, and, by careful experiment, I have found the additional consumption of small coal to be 9 cwt. per twelve hours—this, therefore, is all the cost of working the machine. I have but to add, that I am gratified with the performance of the machine in every respect—the colliery kept me in continual fear of an accident before erecting the machine; whereas, the ventilation is so much improved, we now work without danger; and I am happy to bear this testimony in its favour.

I remain, Sir, your obedient servant.

RICHARD BAKER.

MR. Wm. FOURNESS, Leeds. The above being occurrences, which have taken place in the course of nearly an hundred years, the maximum number of explosions have happened in those months—the barometric pressure of the atmosphere being at that season of the year (with few exceptions) the lowest; this would retard the ventilation, at the same time the per centage of carburetted hydrogen in the pit proportionately increased, on account of the pressure being partially removed from the surface of blowers or other openings emitting gas.

## ARTIFICIAL FROST AS A MANURE.

Sir,—You will think it strange enough that I should choose your paper for the following subject, but, from the perusal of Dr. Murray's scientific remarks, I feel that I cannot elicit the attention of a better person—that gentleman having talent, and, evidently, no objection, to treat eligible matters through your columns. I have long made it a question whether "artificial frost" could not be effected upon land up to the time of preparing for seed—then, whether the thawing ingredient might not be such as to convert the whole into manure, whether even a momentary cold, of so great a degree beyond the freezing point, might not instantaneously destroy all worms.

Pool, Illogan, April 13.

## BOILER EXPLOSIONS.

Sir,—The many disastrous events which have been noticed in your Journal, from time to time, in the last few months, might have been prevented from taking effect, by the very simple plan of having a small hole drilled in a boiler-plate, immediately over the fire-place—the same being filled up with a lead rivet—so that when the water gets below the proper level, the lead will melt, and the water and steam will force its way into the fire, and extinguish it before an explosion takes place. I have had this applied to boilers under my care, for many years, and it answers the purpose very well.

Carnarvon, April 24.

W. WHEELER.

## CHILI—ITS MINERAL AND OTHER RESOURCES.—No. V.

Comparative Observations of the Mines of Mexico with those of Chili, relative to their qualities and their advantages, according to information furnished by Senor DON HILARIO PULINI, Director-General of Public Works to the Republic of Chili, at present on a special commission in Europe.

Method of Dressing.—They commence digging the vegetable earth and the poor layers; and, by trying them, they know what they contain, and those that are not worth washing are put aside. They continue clearing the earth until they come to the layer, or *manto*, as already described, and, whether it is rich or poor, they throw it up on the opposite side, and after they have got from thirty to forty-five tons (which makes ten to fifteen *cajones*—a measure of the Chilian miners of about 66 cwt.), they cut a little canal or *canaleta*, eight *varas* (seven and a half yards English) in length, and eighteen inches in width, seven to eight inches in depth, and six to seven inches in slant, called the current. At the head of this *canaleta*, there is a place on a level, and only eighteen inches square, called *la cocha cabecera*, without any current (so that the gold may be detained), and, at the extremity of the *canaleta*, a *cocha*, or square, similar to the *cocha cabecera*, is opened, so that the water may flow, abandoning therein the gold, and this *cocha* is called "*cocha de la cocha*," and in this state, by means of a little canal, the water is let through to the head of the *canaleta*, where a miner is stationed, with shovel in hand, close to the heap that is to be washed, called "*lucer correr*." Having thrown three or four shovel-fuls into the *canaleta*, another miner, who stands barefooted, in the middle of the *canaleta*, with a shovel, keeps turning over the sand, to dilute it. When the sand, clay, and light particles, have been washed away by the water, and the heavy pebbles have filled the *canaleta*, the miner, who is in the *canaleta*, shovels them out; the sand is then again put in, and thus he continues, until he has finished the whole heap of sands that were brought there, and washed in the *canaleta* that had been dug near to it; as has already been described. The last residuum which remains in the *canaleta*, concentrated by the washing, consists chiefly of magnetic iron, quartz sand, and other sands, not very fine, and the gold: all this they take out with a scoop, made of horn, from eight to ten inches long, and three to four in width, formed like a small boat, called *porana*. With this scoop they continue to take it out, and place it on a round wooden concave dish, eighteen inches in diameter, and three inches in depth in the middle, diminishing, by degrees, up to the brim, (they are named *bateas*), until it is filled, and if any more sand remains in the *canaleta*, they fill other dishes, until the whole is cleared out. All this done, they convey the *bateas* to where there is plenty of water, and wash it with great care by an eccentric circular movement, causing the sand to flow over the brim of the *batea*, so that the gold may settle in the middle. This operation continues, until the whole of the foreign particles have been shaken out of the *batea*, and the gold alone remains, well washed and clean. This is the only method they have as yet in Chili for cleansing the auriferous sands, and for the light layers from one to four yards in thickness; but, beyond that depth, they do not dig the earth, but work it the same as for sinking a mine, until they reach the *cicla*, and then, taking off the stratum, or *manto*, they begin to work in a manner nearly similar to that employed in the coal mines.

These methods, described by Senor Pulini, are far from meeting with his approbation, because, in the first place, they cannot wash, by these means, above twelve tons of earth per day; and, secondly, because, in performing the operation, it requires four persons—viz., two for washing one outside to regulate the water, and the other to keep the *cocha de la cocha* always free from obstructions—but one of the greatest disadvantages of this system is, that they lose a considerable quantity of the finest particles of the gold, which are carried away by the water, in consequence of the imperfect construction of the *canaleta*; and, lastly, that the miners have always the gold in their hands, and at their disposal to secrete part of it, which is too frequently the case, and that to some amount.

To remedy these difficulties, and for the purpose of undertaking operations on a large scale, they must make use of machinery, as already stated, and they would soon reap a "golden" harvest.

Senor Pulini was lately the engineer, who directed the works for cutting through a rock of grey granite, which traverses a small rivulet in the district already named of Casa Blanca, on the spot called Laguna de Maquagua, with the object of lowering the level of its waters to their primitive bed, as it receives all the waters from several of the auriferous mountains and hills; it is generally known, and experience has always proved, that all the rivers in the vicinity of auriferous earths contain in their primitive beds large quantities of gold. This grand undertaking was got up by a company, who named the above engineer to reconnoitre this place; and, after having taken the necessary levels, so as to calculate the primitive bed, he devised a plan, which was carried into execution; and when the cutting was opened five *varas* in depth (four and a half yards), and the waters descended, they found a good quantity of gold, though the cutting was not half-finished, which was deeply regretted by this engineer, as it was requisite that he should come to Europe before the conclusion of that work, and he was not enabled to see the result of this great undertaking; but he knows that the cutting is still continued upon his plan. This gentleman states, that the riches that will be derived by this company, called "De Maquagua," and the success of this undertaking will, no doubt, give rise to several others of the same description, as there are a great number of these rich river beds.

## BEFORE THE VICE-CHANCELLOR OF ENGLAND.

(Sir L. SHADWELL).—April 24th, 1845.

"DOLLOND & REED AND DELL."—MR. BETHELL moved for an injunction, on behalf of Mr. DOLLOND, of St. Paul's Churchyard, London, the celebrated Optician, to restrain the defendants from engraving his name on any Telescopes manufactured by them; or from selling any Telescopes with his name, or any colourable imitation of it, engraved thereon. The learned counsel stated, that the plaintiff inherited the discovery and reputation of his eminent ancestor, John Dollond, who, in the year 1758, invented the Achromatic Telescope, which was considered at that time, and down to the present, as, perhaps, the greatest discovery ever made, and which had eluded the observation of the immortal Newton. John Dollond had the friendship of all the eminent men of science of that day; and the learned Counsel enquired in the highest terms the Achromatic Telescope, and stated that a patent had been granted for it in the reign of George II. The great reputation the Achromatic Telescope had attained, had given occasion to all sorts of colourable imitations of the plaintiff's name, such as "Dollond," "Dolond," and "Doland," and sometimes it was spelt correctly; and, with these names so fraudulently engraved thereon, Telescopes were sold in this country, as well as abroad; and they were often brought by the public to the plaintiff's shop, where they were instantly detected as never having been made or sold by the plaintiff. These practices were a great injury to the plaintiff, both pecuniarily, and in his reputation as an Optician; and he had, for some years, been endeavouring to find out by whom such frauds were committed, but without success, until the present occurrence. The present application was intended to put a stop to such fraudulent practices. In the present instance, the defendants had engraved the plaintiff's name correctly on some Telescopes; and the fact of their doing so became known to the plaintiff, in the early part of the present month, in consequence of a workman of the defendants calling at the plaintiff's shop to make an inquiry; and, in the course of doing so, he inadvertently produced two Telescopes out of a bag (where he had others) to the plaintiff's clerk, who, upon seeing them, saw they had never been manufactured or sold by the plaintiff, and instantly pronounced the name of the plaintiff engraved thereon to be a forgery. The man became confused, and said he should lose his situation for what he had done, and hoped the clerk would not mention it to the plaintiff. The clerk replied, he should, and did so; upon which the present application was made.

The VICE-CHANCELLOR.—It is the clearest case I ever knew. It appears to me to be a matter of great importance that this should be made public known, because if these inferior Telescopes are used by merchant-vessels, by yachts, and so on, they might produce the greatest mischief.

MR. BETHELL.—The mischief, your honour knows, to merchant-ships, and all persons buying them, can scarcely be calculated. From these Telescopes of Mr. DOLLOND, I believe the greatest benefits in the world have been derived to all persons who have had occasion to use them.

The VICE-CHANCELLOR.—You may take the injunction, with costs.



## BLAENAVON IRON AND COAL COMPANY.

A meeting of the proprietors of this company was held at their offices, Pan-cras-lane, City, on Friday, the 25th instant. The chair was taken by K. H. KENNARD, Esq. The directors, after submitting to the shareholders the details of make and sales of pigs, bars, &c., and the profit arising therefrom, for the year ending Christmas, 1844, added in their report, as follows:—“Your directors are happy to inform you that since Christmas a considerable increase in the make of iron per week at each furnace has been effected, without any deterioration of quality. The produce of the five old furnaces now greatly exceeds that of any former period, and is, in fact, equivalent to the employment of another, or sixth furnace, without the proportionate expenses attending it. This increase in make, accompanied by reduction of cost, has placed the old works in a position to take the full benefit of improved demand and prices; and will, the directors trust, be accepted as a proof that diligent attention has been paid to economy and good management. The shareholders must be aware that the anticipations of ‘permanent improvement’ in the iron trade, with which the report closed last year, were not only not fulfilled during the remainder of the year 1844, but that the price of iron fell twice during that period, while wages were increased 10 per cent. Since Christmas, however, prices have been progressively and rapidly advancing, and your directors are sanguine in the belief, that in consequence of the vast increase of the railway system throughout the world, and the demand for ship plates and other purposes, the iron trade has now attained a state of decided prosperity, which has every appearance of continuance. Before any dividend can be declared, it will, of course, be necessary that the accumulated loss of past years should be swept off. At present prices, however, the profits are so considerable, that the directors look forward with satisfaction to the prospect of clearing off this account, and declaring a dividend in the course of the autumn.”

A special report, embodying a plan for paying off the debentures of the company, and raising capital, for the purpose of bringing the new works into operation, by an issue of scrip shares, was then offered to, and unanimously adopted by, the proprietors at the meeting; and resolutions were accordingly passed, to be confirmed at the meeting to be held for that purpose on Friday, the 16th May, 1845. The directors who went out were re-elected, to whom, and the manager, the thanks of the meeting were voted unanimously. Thanks having been voted to the chairman, for presiding, the meeting adjourned.

[It may be expected, that the declaration of a dividend in the autumn, which was elicited during the discussion, by the knowledge of the large profits that are being made, will have the effect of improving the price of shares (which have lately risen to eight times their price, previously to Christmas) considerably above par, and making the new scrip shares, which are proposed to be issued, eagerly sought for by the shareholders.]

## UNITED HILLS MINING COMPANY.

A special general meeting of the shareholders of this company was held at the office, in Adam's-court, Old Broad-street, on Thursday, the 24th inst., for the purpose of raising an additional capital by way of issuing 800 new shares.

The chair was taken by Mr. CLARKE, one of the directors.—The SECRETARY then read the directors' report, which dwelt principally on the expediency of working the deeper levels, where the ore was found to be valuable in quality, and held out good prospects for the application of a further sum of money, which had induced the directors to recommend the additional capital now proposed. Letters from the agents were also read, and were confirmatory of the benefit likely to attend further operations.

The CHAIRMAN said, they had been called together to consider the propriety of adopting some plan to raise a further sum of money for more effectually carrying on the mining operations; the only scheme which appeared practicable for raising the amount was, the issuing of an additional number of shares.

Mr. CAMPBELL wished to know if it was proposed to pay the whole sum at once?—The CHAIRMAN said no, by instalments.—Mr. TAYLOR thought the agents' reports were of a desponding nature, and that if the money were obtained, they would find themselves in a similar position that day six months.

The CHAIRMAN said, the agents' reports did appear exceedingly lowering, but it arose from part of the works having been suspended, in consequence of the low price of copper not enabling them to work the inferior kind of ore under the present standard. It was very clear that they would not have called this meeting but for an important reason, which was, that last year copper was about 5s. 10s. higher than at the present moment, which would exhibit a loss of about 2000l. on the year. As to the price at which the shares should be issued, was a question to be decided by the meeting.—Mr. CAMPBELL asked what they owed the bankers at present?—The CHAIRMAN replied about 500l., and about 1000l. to the bankers in Cornwall.—Mr. BARKLEY asked if they were necessitated to call for this money before the next meeting, which would be in the month following?—The CHAIRMAN and Mr. TYAS both spoke of the necessity of embracing the present season for their operations.—A PROPRIETOR asked the amount that would be available for their works?—The CHAIRMAN said, it would be about 1100l., for carrying on the operations; the rest would pay off what was due to the bankers. In the meantime, they would go on sinking from the eighty to the ninety fathom level, where they found the ore more valuable as they descended. They had never found good ore at the west hitherto, but, if they proceeded, there was no doubt of a good result.—Mr. TYAS said it was a mistake for any one to say they were losing on the mine, for on the united mines they were making a profit. In going from Wheal Sparrow, they were aiding Wheal Charles, and were discovering good ore ground also.—A PROPRIETOR asked how long they would be driving the present level?—The CHAIRMAN said, from three to four months. At the eighty fathom level the ore was worth 80l. a fathom, and the deeper they went the greater was the quantity of good ore.

Mr. TAYLOR said, the prospect might be very pleasing to the directors; but he must look to the expenditure necessary for carrying on that prospect. These 800 shares would bring 2600l., and after they had paid off their debts, he would ask, in what better position they would be by the next meeting?

The CHAIRMAN hoped it would be clear to every one, that it was expedient immediately to sink the shaft from the eighty to the ninety fathom level, from the improved appearance of the ore, which was the best probability of the money being spent advantageously for the mine.—A PROPRIETOR asked, if they could not wait till the next meeting, when a more detailed financial statement would be exhibited.—Mr. CAMPBELL said, the resolutions passed now must be sanctioned by another meeting.—Mr. TYAS said, it was not necessary; that meeting was conclusive.—Mr. NICHOLSON asked, if the amount required was ample for the works contemplated, as it would not be advisable to come a second time for the same purpose.

The CHAIRMAN said, the sum was sufficient. In relation to the shares they would be offered *pro rata* to the shareholders. Mr. Michael Williams had assented to take his quota, and he held one-fifth of the mine; besides, they had, at least, assents from half of the proprietors, to take the new shares proportionably.—Mr. FAITH moved the adoption of the report, which was passed unanimously.—On the motion of Mr. CAMPBELL, seconded by Mr. TAYLOR, the following resolutions were passed unanimously—namely:

That, for the purpose of raising further capital, 800 new or additional shares of 5s. each be created, and that such shares have all the rights, privileges, and advantages of the present shares, but without any priority in payment over the same, and that, in the first instance, such new additional shares be allotted to, and apportioned amongst, the present shareholders, according to their number of shares, in the proportion of one new or additional share for every five shares held by them; but that in such apportionment no notice be taken of any less number of shares than five.

That, to entitle himself to such apportionment, each shareholder shall deposit with the secretary of the company his requisite number of scrip shares, and also pay, on or before the 24th day of May next, the sum of 3s. 6s. for every new or additional share to be allotted to him, in pursuance of the above resolution.

That the shares not taken up and paid for on or before the 24th day of May next, be offered rateably, and on the same terms, to any other of the holders of the present scrip shares willing to accept the same, and paying such sum of 3s. 6s. a share on or before the 24th day of June next.

That, after such 24th day of June next, it be in the discretion of the directors to sell, from time to time, for the benefit of the company, all or any of the new or additional shares not then paid up, or taken up, by the present proprietors, at such price as the directors may seem expedient, being not less than 3s. 10s. a share.

That the directors be fully empowered to carry the above resolutions into effect, and that such resolutions be appended to the Deed of Regulations, and henceforth form part thereof.

A vote of thanks was passed to the directors, when the meeting separated.

WEST INDIA MAIL.—The *Trent* arrived at Southampton, on Tuesday, bringing the mails, and having on freight £140,206; gold, gold dust, &c., 75l. British copper coin, 424½ oz. silver, 55 lbs. 2 oz. platinum, 2210l. pearls, besides cargo.

## COAL MARKET, LONDON.

MONDAY.—Price of coals per ton at the close of the market:—Carr's Hartley 16 6—Chester Main 15 9—Eden Tanfield 14—Hastings Hartley 17—Holywell Main 16—North Tanfield 12 6—Old Pontop 13 6—Orl's Redheugh 14 9—Pontop Windsor 14—Taylor's West Hartley 16 3—Tynrhyl 15—West Hartley 17—West Wylam 15 6—Wylam 15—Wall's End Bewick and Co. 18 6—Killingworth 16 6—Tynrhyl 16—Whitworth 16—Brad-dy's Hutton 20 3—Hutton 20 to 20 3—Pemberton 17 6—Cardiff 20—Hesleden 16 9—South Kelloe 19 3—Eden Hartlepool 17—Tees 19 6—Brynddy hand-picked 20 6—Powell's Duffryn Steam 22 3—West Hartley Netherton 16 3—Ships arrived, 32.

WEDNESDAY.—Carr's Hartley 17—East Tanfield 13 6—Holywell Main 16—North Tanfield 13—Old Pontop 13 6—Orl's Redheugh 14—Ravensworth's West Hartley 16 6—Taylor's West Hartley 16 3—Tanfield Moor 17—West Hartley 17—West Wylam 16 6—Wylam 15—Hawsett 20 6—Hutton 20 6—Lambton 20—Kelloe 19—Thornley 17 6—Ade-lade 19 6—Eden Hartlepool 17—Cowdon Tees 17 6—Maclean's Tees 16—Seymour Tees 19 9—Powell's Duffryn Steam 22 3—Ships arrived, 37.

FRIDAY.—Carr's Hartley 17—Davison's West Hartley 17—New Tanfield 14—North Tanfield 13—Taylor's West Hartley 16 6—West Wylam 15 6—Wylam 14 9—Wall's End—Killingworth 16—Brad-dy's Hutton 19 3—East Hutton 17—Hawsett 20 3—Hutton 20—Lambton 19 3—19 6—Hartlepool 19 9—Hough Hall 17 6—Kelloe 19 3—Seymour Tees 19 6—Hartley 16—Powell's Duffryn Steam 22—West Hartley Netherton 16 9—Woodfield Coke 26—Ships arrived, 31.

## Mining Correspondence.

## ENGLISH MINES.

## EAST WHEAL ROSE MINING COMPANY.

April 15.—An account held on the mine of profit and loss for Jan. & Feb. is—  
Proceeds of lead ore sold January and February months... £18,079 17 6  
Cargill adventures, for water charge, &c... 108 0 0  
Three-fourths of Cargill profits brought to this account... 771 1 9—15,938 4 8  
January and February labour cost... 2,401 19 3  
Merchants' bills, including new steam whinn-engine... 3,006 12 7  
Lords' dues... 974 10 4—7,999 8 2  
Showing a profit of 7959l. 11s. 1d.; to which add balance in hand last account, 1143l. 11s. 6d.—making a total of 9103l. 2s. 7d.; from which deduct 7680l. for a dividend of 60l. per l-128th share, leaves a balance in hand of 1423l. 2s. 7d.

## HOLMBUSH MINING COMPANY.

April 21.—In the 120 fathom level, west of the cross-cut, the lode is ten inches wide, and worth about 5l. per fathom; in the cross-cut south the ground is more favourable for driving. In the 110 fathom level, west of Hitchins's shaft, the lode is two feet wide, and worth 85l. per fathom; in the stopes in the back of this level, east and west of Mitchell's winze, the lode is sixteen inches wide, and worth 18l. per fathom; in the stopes west of Goldworthy's winze the lode is ten inches wide, and worth 9l. per fathom; in the stopes west of Lobb's winze the lode is sixteen inches wide, and worth 20l. per fathom; in the stopes west of the pump winze the lode is twenty inches wide, and worth 35l. per fathom. In the 100 fathom level, west of Hitchins's shaft, the lode is ten inches wide, and worth about 4l. per fathom; in the stopes in the back of this level the lode is one foot wide, and worth 18l. per fathom; in the winze sinking below this level the lode is fifteen inches wide, and worth 22l. per fathom. In the ninety fathom level, west of Hitchins's shaft, the lode is nine inches wide, and worth 5l. per fathom; in the stopes in the back of this level the lode is eighteen inches wide, and worth 26l. per fathom. In the sixty-two fathom level, west of Hitchins's shaft, the lode is ten inches wide, producing good stones of ore. In Bray's shaft the ground continues favourable for sinking. The new engine-house at Hitchins's shaft will be completed by the end of this week; immediately after the engineers will begin to leave in and fix some of the heavy parts of the engine which are now on the mine; the remainder we hope to have up from Hayle in the course of a week or two. Some parts of the pit-work are now on the mine, and we hope the remainder will be also quite in time for the completion of the work in the shaft by the time the engineers complete their work at surface. T. RICHARDS.

## COOK'S KITCHEN MINE.

April 19.—At North Tincroft, the lode in the stopes, in the bottom of the sixty fathom level, is five feet wide, worth 14l. per fathom; we have cut a small branch underlaying towards the lode in the cross-cut south from flat-rod shaft, at the seventy fathom level, by which we judge we cannot be far from our object. Eudey's lode, in the stopes, in the bottom of the eighty-two, is six feet wide, worth 15l. per fathom. In the cross-cut, at the ninety-two fathom level, we have cut a dropper about four inches wide, underlaying very fast towards the lode, and containing rich stones of tin. Chapple's lode, in the 160 west, is very large and good; we have driven through it nine feet, and have yet no south wall; the part we have driven through is worth 55l. per fathom. We are still carrying the 140 east, four feet wide, and for that width it is worth 8l. per fathom; we expect in another week to hole to a winze sunk from the bottom of the 133, which will enable us to set some ground there at a favourable tribute. We are compelled to suspend the 170 fathom level, on Dunkin's lode, the water being so much increased as to oblige us to drop a small lift from the 126 fathom level in the south sump shaft to keep it. This lode, in the 140 west, is four feet wide, worth 7l. per fathom. In the cross-cut south from Rogers's shaft we are through the elvan, but have not yet cut the lode. We are proceeding with the cross-cut from the Druid shaft to cut the caunter lode through very easy ground. Our tin pitches are looking very well, and we have large quantities of tin stuff broken underground and at surface, which the addition to our steam stuffs will, when completed, enable us to return more speedily than we can at present. A. EUDEY.

## BEDFORD UNITED MINING COMPANY.

April 21.—At Wheal Marquis, the capels of the lode were cut last Saturday in the seventy fathom level cross-cut south, and we hope in our next to give you a favourable report of the same. In the fifty-eight fathom level east the lode is two feet wide, composed of spar, munda, and ore; and in this level west the lode is two feet wide, composed of spar, munda, and ore. There has been no lode taken down in the forty-seven fathom level west; the lode in the stopes, in the bottom of the forty-seven fathom level east, is two feet wide, and worth 15l. per fathom. In the deep adit level the lode is without alteration. The pitches are looking well. At Ding-Dong, the lode in Thomas's engine-shaft is two feet wide, composed of spar, munda, and ore; and in the twelve fathom level east the lode is eighteen inches wide, composed of spar, munda, and ore. At Wheal Tavistock, the lode in Phillips's engine-shaft is two and a half feet wide, composed of gossan, spar, and black and grey ore—altogether a very kindly lode. At Delve's Kitchen we continue clearing the adit level; we have costained on one of the newly discovered lodes for about seventy fathoms in length, and find the lode to be on an average two and a half feet in width, composed principally of strong gossan, with spar and ore, and very kindly; we are about to sink a few fathoms on the course of this lode, for the purpose of ascertaining its character at a greater depth. J. PHILLIPS.

## WHEAL POLLARD MINING COMPANY.

St. Cleer, April 18.—We commenced operations in this mine by an open cutting, for the purpose of the discovery of lodes, and have found nine lodes of a very promising appearance; on the course of three of these we are sinking shafts, and find the lodes to consist of quartz, gossan, and fluor-spar, spotted with yellow copper ore, but we do not expect that we shall be able to explore these lodes many fathoms deeper without the aid of a steam-engine to drain the water—therefore, we beg to recommend the shareholders to come to the conclusion, with as little delay as possible, to order the erection of a 22-inch cylinder steam-engine, for the purpose of draining the mine. We have also erected a smith's shop and count-house, and have driven an adit level forty-nine fathoms, and intersected one lode, and extended a level on it seven fathoms. The adit end is about six fathoms distant from the second lode, on which an engine-shaft has been commenced, which is now at the depth of five fathoms from surface. JAMES NANCE.

## WEST WHEAL JEWEL MINING ASSOCIATION.

April 21.—The 100 west, on Wheal Jewel lode, is small and unproductive; the 100 east, on ditto, no lode taken down in the past week; the eighty-five east, on ditto lode, is eighteen inches wide, and worth 4l. per fathom; the eighty-five west, on ditto, lode six inches wide—poor; the seventy west, on ditto, lode one foot wide, containing occasional stones of ore. At the eighty-five cross-cut north the ground is favourable—winze sinking below the forty-two east, on Buckingham's lode, worth 3l. per fathom. At the thirty east, on Morecomb's lode, the lode is two and a half feet wide, composed of spar, peach, munda, and spots of yellow ore. At Wilkinson's engine-shaft, sinking below the fifteen fathom level, the lode is two feet wide, composed of spar, munda, and stones of ore. S. LEAN. R. JOHNS.

## UNITED HILLS MINING COMPANY.

April 22.—In Williams's shaft no alteration since survey-day. In the eighty fathom level, in driving east and west, the lode continues much the same as last reported. In the seventy fathom level, in the eastern end, the lode is three feet wide, two feet of fair quality; in the western end the lode is three and a half feet wide, fourteen inches ore of average quality; in the winze we have cut into the lode, two feet of which is good ore. In the sixty fathom level, east of Harper's winze, the lode is three feet wide, two feet ore of good quality. East of eastern shaft the lode is three feet wide, two feet good ore, looking promising. West of James's the lode is four and a half feet wide, producing ore throughout, of average quality; in the winze the lode is three and a half feet wide, two feet good ore. In the fifty fathom level the ground is much the same as last reported. At Wheal Sparrow, in the fifty fathom level, in the eastern end, the lode is four feet wide, not producing any ore; in the western end the lode is two and a half feet wide, producing some stones of ore. In the forty fathom level, in the eastern end, the lode is small and unproductive; in the western end the lode is eighteen inches wide, producing a small quantity of ore. In the thirty fathom level the lode is three feet wide, ore throughout, of average quality. T. TREVENEN. R. WILLIAMS.

## TINCROFT MINING COMPANY.

April 21.—The engine-shaft is now about six fathoms below the eighty fathom level; no lode in the shaft at present. The lode in the eighty fathom level east is twenty inches wide, producing some very good ore, and kindly; the lode in the eighty west is twenty inches wide, composed chiefly of munda, with rich stones of ore; much the same as in the level above immediately over. The lode in the seventy east is three feet wide, six inches wide good quality ore, the remainder ores of coarse quality; the lode in the seventy west is two feet wide, ore throughout, worth 18l. per fathom. The lode in the sixty east is three feet wide, nine inches good quality ore, worth 15l. per fathom. The sixty, fifty, and forty west, are producing some coarse quality ore, and kindly. Our pitches in this part of the mine continue to yield fair quality work. Palmer's shaft is now about five and a half fathoms below the sixty, on south lode, which is two feet wide, producing some ore. The stopes in the bottom of the sixty, on north lode, are producing good quality ore. The sixty and west is improving for ore. Four pitches continue to yield good work. At the south mine, we have got the water out to the 100 fathom level; we have set to drive east and west on South Highburrow lode at that level, and several pitches on tin; we shall soon be drawing out the water below the 100, and shall then be able to set several other pitches on tin and ore, so as to require our stamps in full operation. We have commenced working in Wheal Providence, repairing shaft, &c., and are making preparations for fixing flat-roads, to enable us to clear the mine. I, with pleasure, still say our prospects are very encouraging. WILLIAM PAUL.

## TRELEIGH CONSOLS MINING COMPANY.

April 19.—At the seventy, west of Good Fortune, the lode is about two feet wide—kindly, with stones of ore. At the seventy, east of ditto, lode two feet wide, but little ore; at the sixty, west of ditto, lode about three feet wide, and worth 30l. per fathom. At the sixty, east of ditto, driving north to cut a north part of the lode, which is working on tribute in the level above. At the fifty, west of Symons's, the lode is two and a half feet wide, and worth 16l. per fathom; at the forty-four, west of ditto, the lode is about twenty inches wide, with stones of ore; at the thirty-four, west of ditto, the lode is eighteen inches wide, rather kindly, but not much ore; at the twenty, west of ditto, the lode is fifteen inches wide, looking rather kindly, but, at present little ore; at the adit, west of ditto, the lode is fourteen inches wide, unproductive. At the fifty, west of Garden's, the lode is fifteen inches wide, with stones of ore. I beg to state, that we are getting on rather slow with the engine, having been disappointed in getting the working gear, &c., from the foundry; they have missed some of the castings, and are obliged to recast, in two or three instances; as the engineers say it will require a week more to get to work—I fear more, as they are in general slow in their movements. W. SYMONS.

## CORNUBIAN MINING COMPANY.

April 21.—The lode in the eighty six fathom level, going west of Murray's engine-shaft, is worth 20l. per fathom, and the pitches working over from the bottom of the seventy-eight fathom level are also yielding a fair quantity of lead. The eighty-six fathom level, driving east, is much the same as noticed in last report (a promising level); the pitches working east of Murray's engine-shaft, at the seventy fathom level, on the north lode, by fourteen men, continue to look well. We sampled on Friday last, the 18th inst., computed thirty-three tons, of rich silver-lead ore. R. ROWE.

## CALLINGTON MINING COMPANY.

April 21.—In cross-cutting towards the lode, from Johnson's engine-shaft, the ground is more favourable for driving. In the ninety fathom level, driving north, the lode is worth 9l. per fathom; driving south it is worth 8l. per fathom. In the eighty fathom level, both north and south, we are opening tribute ground. In the sixty fathom level the lode has not been taken down. At the north mine we have divided the shaft to a ninety fathom level, and expect to complete the shaft by the end of this week. In the eighty fathom level the lode is worth 7l. per fathom; we have suspended operations in the end for the present, having put the men to rise, in order to improve the ventilation of this and the seventy fathom levels, where we are sinking a winze to communicate with the said rise; in these places the lode is yielding work of good quality; the contra lode, at the last-mentioned level, continues of the same promising character, worth half a ton of ore per fathom. In the sixty fathom level we are driving through tribute ground; the same may be said of the forty fathom level. J. T. PHILLIPS.

## WHEAL SARAH MINING COMPANY.

April 19.—Agreeably to your request you have my report of this mine. The lode in the twenty fathom level south is three feet wide, composed principally of gossan and manganese, angular fragments of carbonate of iron, with crystals of carbonate, and spots of sulphate of lead. The lode in the north end is two and a half feet wide, containing granular galena in gossan, and decomposed clay slate, with a view of flookan on the foot wall. The stopes in the back of this level, are producing ore of good quality, the lode is about two feet wide; the western part of it is composed of manganese and gossan, tinged with phosphate of lead. The eastern part, which is about eight inches wide, consists of friable quartz and gossan, containing ores, &c., producing eight parts of pure lead in twenty parts of the ore, and 126 ounces of fine silver to a ton of the former. It will not be improper to observe, that the large vein consisting of a dark blue slate, to which I have hitherto called your attention, has intersected the lode obliquely at the level to which I have just adverted; the latter is, therefore, traversing the former, and it is, consequently, less productive at present. In examining this vein, as far as we could see it, through the excavations made on the surface, we considered it was parallel with the lode—the western part being a lamellar clay slate; but the eastern part, especially near the lode, is now friable, less schistose, and has a conglomerated appearance. Small quartz veins may be seen at the point of this quarry, and in some places they penetrate the lode, when this is the case, ore makes its appearance. This vein is evidently destroyed going north, as the nine fathom level is driven through it, where the lode is traversing an exceedingly favourable stratum. The last twelve fathoms have been extended through a vein of ore about six inches wide, consisting of carbonate and sulphate of lead in gossan, leaving ground which will work at a moderate tribute. The manganese here too being tinged with phosphate of lead; the small quartz veins taking the lode north east, containing galena, and the minute branches of decomposed slate bearing down on the foot wall, saturated with the salts of lead, are favourable indications, and would justify lead us to anticipate that a larger deposit of minerals, would be found at deeper levels. About fifty fathoms north of our present workings, a large porphyritic vein traverses nearly east and west, and consequently crosses the lode. This is in a very good geological position, with a lightish blue slate contiguous to it, the dip of cleavage of which is towards the lode; we do not hesitate to say, that, it is the most favourable piece of unexplored ground of any in this neighbourhood. We have about ten tons of ore on the surface. Mr. Johnson, who was here a few days ago, examined, with myself, both the surface and underground operations, when we decided on sinking a few pits on the back of the lode, north of our present workings, to ascertain the best spot to sink an engine-shaft. Secondly, to communicate the nine fathom level with the cross-cut driven in the low ground at a time not now known; this will not only prove the lode in that direction, but will ventilate the whole workings. Thirdly, to extend the twenty fathom level north and south with all expedition. Fourthly, to sink a small shaft below the twenty, on course of the lode, to get below both the gossan and the hard vein—the dip of which is greater than that of the lode; and, lastly, to sink a winze at or near the point of the nine fathom level to communicate with the twenty, when the latter shall have been brought in a line with it. Should the lode open on these points to our satisfaction, and we have no reason to doubt it, more adequate machinery will be found absolutely necessary to work the mine effectually. I trust our little engine will keep down the water to enable us to accomplish our object, when you shall be duly apprised of the result. J. PRICE.

## MINE ACCIDENTS.

Wheal Henry.—J. Manley fell from a ladder, and was killed.  
Mercuri's Coal Pit, Rhymney.—T. Gomer was killed while at work.  
Cwm Llynfall Colliery.—T. Watkins was killed here.  
Bewick, Lancashire.—J. Griffith was killed by a fall of rubbish while employed in one of Messrs. Williams and Sudlow's pits.  
Cwmfach Colliery, Dolcoath.—W. Charles was killed by a fall of roof.

## MAESTEG IRON-WORKS.

Sir,—In your paper of the 19th inst., I find it stated, under the head of "Mine Accidents," that a young woman was lately killed at Maesteg Iron-Works by an "immense fall of roof." This is altogether untrue. Such an accident could not have occurred here, as no females are ever employed underground at these works. The statement which has been furnished you has no foundation whatever. C. J. HAMPTON, Manager of Maesteg Iron-Works.

## MINE CLUBS.

Sir,—I beg to ask if you know what has heretofore been done with the surplus monies from prosperous mine clubs, after the stopping of the respective mines? Presuming that the subject of a "Widows' and Orphans' Club" is dear to you, I also ask, whether you would not like to appropriate thereto all sums thus accruing? Surely, the contributions of the wounded and deceased miners should return to the widow and children of the miner. JOHN PHILLIPS.

Pool, Illogan, April 18.

POST MAP OF EUROPE.—The great and rapid advance, during the past twenty years, of commercial enterprise, the establishment and gigantic extension of the railway system, with the improvements in inland navigation, and the multitudinous diversion of the old, and the formation of new common turnpike roads, consequent on the increased requirements for facilitating international communication, has rendered the very best of our maps (even though published at a comparatively recent date) in a great measure incorrect, and, for commercial accuracy, not to be depended on; while a large portion of information of the highest importance to the traveller, the merchant, and the statist, is necessarily either entirely out of their reach, or to be obtained but with great difficulty. With his accustomed enterprise and perseverance, Mr. James Wyld, of Charing-cross East, has stepped forward to remove this geographical difficulty, and is now publishing a splendid Post Map of Europe, comprehending England, France, Germany, Italy, &c., with the posts, distances, roads, railways, packet-routes, &c., laid down on a scale of 2½ inches to a degree of latitude. We have now before us the first two sheets, extending over an area of from 42 deg. to 54 deg. of north lat., and long. from 7 deg. west to 22 deg. east of Greenwich. The engraving is of the most clear and legible description; the usual representation of hilly and mountainous districts, by radiating lines, which, of little utility in itself, tends to blind and obstruct the view of the more important parts of a map, are here wisely omitted; the lines of railways and rivers are carefully and distinctly coloured, while every town and village is laid down with clearness and accuracy, securing at once the greatest facility of reference in its commercial and geographical details. This map, when complete, will certainly supply a most important and well-defined representation of this extensive and populous quarter of the world, and will, no doubt, very shortly form an appendage in every club-house, hotel, railway station, and library, in the kingdom, as well as on the continent.

NEW COLLIERIES.—The Thornley Coal Company have won an excellent seam of coal at Ludworth, at the depth of 145 fathoms. The ground was broken at the new colliery, near Castle Eden Inn, on the Castle Eden estate, last week, by Lord Howden and partners.—*Newcastle Advertiser.*



## CAMBRIDGE AND OXFORD RAILWAY.

Capital, £800,000, in 80,000 shares of £10 each. 2s. 6d. per share.

PROVINCIAL COMMITTEE.

Levi Ames, Esq., Thetford, Norfolk, and the Hon. Mr. Lytton, Beds.

The Rev. Henry Arlett, Fellow and Tutor of Pembroke College, Cambridge

Mr. Valentine Beldam, Royston, Herts

Mr. William Bennett, Luton

The Rev. Robert Birkbeck, Fellow and Bursar of Emmanuel College, Cambridge

The Rev. James Black, D.D., Registrar of the University of Oxford

The Rev. Philip Bliss, D.C.L., Registrar of the University of Oxford

Mr. Joseph King Blundell, Luton

Mr. Benjamin Bolton, Luton

Mr. William Bolton, Luton

The Rev. Timothy Fyfe Ford Bowes, D.D., Barton, Beds.

Mr. A. Gutteridge, Brimley, Cambridge

William Frederick Brown, Esq., Dunstable, Beds.

Frederick Burr, Esq., Luton

The Rev. Roger Buxton, Fellow and Tutor of Emmanuel College, Cambridge

General Sir William Henry Clinton, G.C.B., Audley-street, and Cokenagh, Warwick

John Chevalier Cobbold, Esq., Ipswich

William Dodge Cooper Cooper, Esq., Toddington, Beds.

John Curling, Esq., Hitchin, Herts

The Right Hon. Lord Deedes, the Hon. Weymouth, Herts

Charles Drummond, Esq., Charing-cross, and Newcastle, Warwick

William Ekin, Esq., Cambridge

John Ekin, Esq., Hitchin, Herts

The Rev. Charles Eyres, Fellow and Bursar of Caius College, Cambridge

Howard Morris Fawcett, Esq., Newnham, Cambridge

Thomas John Fickins, Esq., Cambridge

Sir James Fyfe, Esq., Cambridge

George Fisher, Esq., the Leya, Cambridge

Robert Fitzjohn, Esq., Baldock, Herts

John George Fordham, Esq., the Priory, Royston

Mr. Edward George Fordham, Esq., Cambridge

John Fordham, Esq., Royston

Mr. Samuel Fordham, Kitchin, Herts

Ebeneser Freeman, Esq., Cambridge

Charles Finch Foster, Esq., Cambridge

George Enoch Foster, Esq., Cambridge

Mr. Joseph Green, Luton

Mr. Jasper Gripper, Hertford

The Right Hon. the Earl of Hardwicke, Wimpole, Cambridgeshire

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The Hon. and Rev. Henry R. York, Wimpole, Cambridgeshire

calculations of this nature, from the report of the committee, it is not expected, that the proposed railway will be completed, and the intermediate time will be employed in having the surveys and estimates carefully prepared, so that no impediment may be then interposed to its successful progress. The line has been examined by Mr. Locke, who has reported that it presents no engineering difficulties of importance, and that in his opinion the capital will be ample for the purposes required. The committee feel convinced that whilst entering into competition with no existing line, this railway will be found a source of reciprocal benefit to all with which it forms any connection; its manifest advantages, in a military point of view, and for the service of the Post-office, will tend to secure to it the patronage of Government, while the great economy and convenience it will afford to all local interests has already insured it the support of the principal landowners.

Applications for shares (accompanied by a reference) may be made on or before the 30th April, to the secretary or solicitors.

**AUSTRIAN AND SARDINIAN RAILWAY COMPANY**

(Original Line), FROM MILAN TO GENOA.—Registered Provisionally, according to Act of Parliament. Notice is hereby given, that the preliminary necessary for the establishment of this company having been completed, the SHARES will be ISSUED on Monday or Tuesday next.

By order of the provisional committee.

CHAS. GUENEX, Sec. pro tem.

Temporary Offices, 27, Lombard-street, April 25, 1845.

**COPPER ORES**

Sampled April 2, and sold at Andrew's Hotel, Redruth, April 24, 1845.

United Mines, 114, 24 18 0

ditto 110, 3 17 6

ditto 100, 5 1 6

ditto 97, 5 1 6

ditto 93, 3 1 0

ditto 88, 3 1 0

ditto 80, 4 3 0

ditto 77, 4 3 0

ditto 70, 4 3 0

ditto 69, 5 12 0

ditto 63, 4 18 0

ditto 58, 5 14 0

ditto 57, 5 17 0

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56 Bell 10 10 5000 Trevelyan Consols 54 48

4000 Bedford 21 7 9600 Tanco Consols 3 114

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## RAILWAY GAZETTE.

## THE ATMOSPHERIC RAILWAY.

REPORT TO THE PARIS ACADEMY OF SCIENCES ON M. ARNOLLET'S SYSTEM.

We last week mentioned the fact, of a report having been presented to the Academy of Sciences, on M. Arnollet's system of atmospheric railways. As we have now a copy of the document before us, we will present our readers with the annexed translation of it.—The idea of employing the rarefaction of air, as a means of transmission, was first mooted in 1810 by Medhurst, a Danish engineer. Since 1824, there have been made several fruitless attempts to apply this idea, till the important invention of Messrs. Clegg and Samuda, in 1838, at length put the success of this novel means of locomotion beyond dispute. It is well known that this system, to which the name of "atmospheric" has been applied, consists in a tube, placed between rails, and in which a steam-engine being placed, produces and keeps up the rarefaction of the air. A piston is urged on in this tube by the excess of atmospheric pressure, and its motion transferred to the outside, by a narrow rod, to which a longitudinal opening affords passage. It is necessary, that a sort of continuous valve should hermetically close this opening in advance of the piston, open to allow of the passage of the rod, and close again immediately it has passed. Messrs. Clegg and Samuda are indisputably the first to fulfil those indispensable conditions, of sealing the longitudinal opening with a plate of leather, properly strengthened and carefully joined by a peculiar composition, raising itself by the action of rollers, attached to the end of the piston, and falling again immediately by its own gravity, so that the compressing cylinders, being heated, close and re-unite anew. This invention was tried, in 1838, on models on a small scale at Chailot, and more lately at Havre. More important experiments were made in the neighbourhood of London, by Messrs. Clegg and Samuda, which, as M. Teisserenc proved in France, put beyond all doubt the applicability of the atmospheric system. Mr. Pim, treasurer of the Dublin and Kingstown Railway Company, proposed and succeeded in obtaining its adoption on the line from Kingstown to Dalkey, about three kilometres in length. This last experiment, made on a large and amply sufficient scale, has completely succeeded: M. Mallet, the divisional inspector of bridges and embankments, has given a full description of its working. It is known that a legislative enactment has authorised the Minister of Public Works, to apply a sum of 1,800,000 francs for new experiments: a measure well calculated to excite a spirit of invention, and one which, of itself, explains the great number of communications relative to atmospheric railways, which have been made this year to the Academy. But, to-day, we must confine ourselves specially to the consideration of M. Arnollet's memorial, which more particularly concerns the economy effected in the establishment for employing the novel force.

On the Dalkey line, the air of the tube is directly rarefied by means of an air pump, moved by a steam-engine. This apparatus works before and during the travelling of a train, but immediately after remains inactive. Thus, in the English atmospheric system a very powerful engine performs a great deal of work, during eight or ten hours, and then rests an hour or more; it is, nevertheless, necessary that the temperature of the furnace should be preserved during the interim, since the machinery must be always ready to resume working. The expense, the loss, and other inconveniences, consequent on this unnecessary continuance, induced M. Arnollet to propose a different mode of rarefaction. In his system an engine of several horses power will be constantly employed to rarefy the air of three reservoirs, each of which has a capacity, at least equal to that of the tube, or of one trifle capacity. These reservoirs will be brought into communication with the tube containing the ordinary air; this rarefaction, when the pressure will not exceed a third of the atmosphere, will put in motion the piston and the train; at the end of the journey, the air, being totally refilled in the reservoirs, will await the pressure of two-thirds the atmosphere, and the continued action of the engine will bring back again this pressure to one-third. To show the advantages of his system, M. Arnollet supposes a railroad about to effect, at the rate of sixty kilometres an hour, an annual transport of 2,500,000 tons, net weight, in passengers and merchandise, or 700 tons daily, distributed over ten trains. This road will be divided into sections of 5000 metres, each of them being served by a partial atmospheric motion. The inventor finds that he will require an engine of 126 horses, to rarefy the air in a tube of 5000 metres' length, and 39 centimetres in diameter, if the English system were adopted; whilst the application of the means he proposes, will not require, under similar circumstances, more than an engine of eight-horses power—that is, of a power sixteen times less. This calculation is on the supposition that the long valve, which closes the orifice, could not allow of the air re-entering.

M. Arnollet deduces many experiments, reported by M. Mallet, to prove that the apparatus at Dalkey admits the re-entrance of the air, at the rate of fifteen cubic metres per kil. per minute. In adopting this result, the author finds that the force of his engine ought to be of about eight or ten horses; but as this defect of the apparatus, and the loss of power which it occasions, are not yet sufficiently studied, we must keep in abeyance the comparison of the two systems in this respect.

Many notes appended to this report give, for the two cases, a calculation of the force employed, and of the effect produced. In the English system, the profitable power expended whilst the engine is in play exactly equals the power produced. The loss of power is then, on the whole, that which represents the fuel consumed, during the intermission of the trains travelling. If one-third the atmosphere is taken for the pressure of the air in the tube, we find that the engine ought to work, during a time, nearly double that which the trains run: the first part of this time being employed in rarefying the air of the tube before departure, since the exterior pressure equals one-third the atmosphere. As to the system proposed by M. Arnollet, if one-third the atmosphere is adopted for the pressure, which the engine reclaims in the reservoirs, the calculation shows that the power now wasted, and which might be rendered available, is to the power produced, in the ratio of five to three; whence it follows that there is a loss of force of ten per cent. This loss, however, when a communication is formed between the three reservoirs, where the pressure is one-third the atmosphere, and the tube filled with air at a pressure of the exterior, at length obtains a pressure of at least half an atmosphere. For if it had been possible to blow off directly the moiety of the air contained in the four capacities united, that which had conducted, as in the English system, to the equality between the power wasted and the power produced, would have clearly employed less power to expel the three first sixths of the air filling the tube, than to expel, as clearly must be done, the fourth sixth of the air of three reservoirs. In fact, the two first parts of the bulk of air originally contained in the reservoirs are expelled once for all; but the air of the tube, compressed by the travelling piston, replaces the second part of this original bulk, and it is in the force required to expel this anew, that the amount of profitable power expended for each train consists. Now, it will be found, on calculation, and readily admitted, that this power would be lightened at least forty per cent. in substituting for the second moiety, whose task is the most laborious, the extraction of an equal bulk and one comparatively so easy, as that of the first moiety of the air contained in the tube: a substitution which would render it precisely equal to the power produced. After these theoretical results, supposing that the expense of one and the other system were equal, if the trains should follow at intervals sufficiently near, or, if proper care were taken, that the fuel consumed during the inaction of the English engine should be, at the most, two parts of that expended during action, the merits of the two systems would be equal, and there would be no reason whatever, as far as economy is concerned, for preferring one to the other.

It is thus, in simple terms, reducing the comparison of the two systems, that we perceive there would be, moreover, the length of the sections, the speed of the trains, the power requisite for traction, corresponding with the speed, the tonnage to transport, the difficulty of the gradients to overcome. It is, then, really impossible that the English system should fulfil the necessary conditions—that its expense should not exceed that of M. Arnollet's system? This is a question which, in our present number, we are unable satisfactorily to solve. Practical data fails to give an accurate comparison of the expenses of an establishment. One can very easily calculate the cost of a powerful engine required by the English system, and that of the pneumatic apparatus, not less expensive than if set to work. But for the system of M. Arnollet, besides his deficient engine, and his air-pump of small dimensions, three impervious and solid reservoirs would have to be erected, and the exact cost of these it would be difficult, if not impossible, to compute. The capacity of each of these reservoirs, according to M. Arnollet, ought to be from 600 to 800 cubic metres, and, in fact, much greater, as we shall soon prove. It will be necessary that the walls should be of a nature effectually to resist every

access of air, sufficiently thick, and adequately supported, to resist an excess of pressure of about seven tons upon a square metre of surface. Would the cost of three buildings of so novel a character, fulfilling all these conditions, be less than even the considerable excess in expense in engines and air-pumps, required by the English atmospheric system? We should be unwilling to affirm this, and we think that every impartial engineer will observe the same caution.

Many experimentalists have recently proposed that means should be taken to diminish, as much as possible, the expense in fuel, during the interim of the engine ceasing its action. They cite a remarkable experiment, made on an ordinary cauldron, in the factory of M. Lemaitre, at la Chapelle: after this experiment, repeated several times, an interruption of an hour, followed by an escape of steam for ten or twelve minutes, only occasioned an increase in the consumption of fuel of about one-third. At the time of the interruptions, all possibility of entrance or escape of gas beneath the cauldron was carefully guarded against, every aperture being closed. At the time of the steam being employed, all the vents being, on the contrary, open, combustion was created, for two or three minutes, by the aid of a ventilator. If this be the fact, the expense, as regards fuel, is not certainly a valid objection in the English atmospheric system.

Besides, the loss of power, which represents the excess of fuel, would soon disappear, for, according to the opinion of one of our fellow savans, M. Arago, the factories, which ordinarily make use of the uncertain power of water-courses or wind, will range themselves round the powerful engines of the English atmospheric system, that they may be able to use a force regularly disposable, but otherwise unemployed; and that this circumstance will, of itself, render it less expensive. There will be, else, a great excess of power wasted by M. Arnollet's system: his loss will be irreparable, and without profit to any one.

These calculations, which have served as a basis for the comparison which we have established, form but a part of many causes for loss of power, such as the re-entrance of air by the valves, the inequalities of pressure which must exist in the tube, the heating of the body of the pump necessary for the compression of the expelled air, and hence the expansion of the heated air; all circumstances which entail a loss of power. But any data, however precise, must fail to estimate with correctness this increase, which must, moreover, apply equally to the two systems. Nevertheless, we must admit, that the system of M. Arnollet exhibits better methods for lessening the loss with which it is connected, than that adopted in England. The time during which the longitudinal valve admits the entrance of the air is shortened. When the air of the reservoirs is rarefied, the inequalities of the pressure must be incomparably smaller than in the long and straight tube, in which the English engine directly works. Lastly, the very much longer continuance of the motive action, and the comparative smallness of the pneumatic apparatus, permits the increase of its dimensions, and the slackening its speed, in a manner essentially to diminish the heat of the body of the pump.

M. Arnollet seems to admit in his memorial, that a power of traction of four kilogrammes per ton, which is more than sufficient to start a train, will still suffice, when the speed is sixty kilometres an hour, or 16 m. 65 a second. This number is evidently too low. Many observations made on railroads, in the neighbourhood of Paris, have conducted to furnish a formula very convenient, as representing the co-efficient of the traction. This formula, which is composed of a constant term, and of another proportional to the square of the speed, gives a traction of 13 kil. per ton, for the speed of 16 m. 65. It has been observed on the Versailles line, that a train, descending freely on a gradient of a hundredth, will acquire a uniform speed of thirteen or fourteen metres, which would give ten kil. per ton, for the traction corresponding with this speed. These two numbers evidently coincide, but they are certainly exaggerated when the train is heavy; for the formula, above cited, supposes that the increase of the whole traction, which results from the speed, is proportional to the weight—a thing which could not be, since the resistance of the air, whence this increase is obtained, must be chiefly employed on the first waggons, and would but partially increase with the number of those that follow. Nevertheless, in adopting the traction of thirteen kil. per ton, which represents a limit, widely contrasted with that of four kil., and preserving a formula annexed to this report, it will be found, that to obtain a speed of sixty kil. per hour, with trains of 120 tons weight in all, it will be necessary, at each station of 5000 metres only, to have an engine of 200-horse power, and one of twenty, and with three reservoirs, having each a capacity of 2000 cubic metres, or one only of 6000. This would be to purchase pretty dearly the advantage of giving to an enormous mass an excessive speed, whose attendant dangers would be frightful, and without prevention. With trains of from fifty to sixty tons or more, and a speed of from thirty to forty kil. per hour, the expense would be three or four times less, and the risk of accidents greatly decreased. Economy and prudence are here combined, as motives for assigning a limit to the increase of advantages which railways can afford. In spite of the uncertainties which do not permit our yet recognising the superiority which M. Arnollet attributes to his system in every particular, we nevertheless, think that in time this system may be able to be applied with advantage, on a railroad intended for a slightly increased traffic and merchandise, at a moderate speed, especially if it were possible to distribute the trains over intervals of equal continuance during the twenty-four hours of the day and night. The memorial of M. Arnollet, which contains views remarkably useful and ingenious, treats a question of great importance, as experience and practice alone could completely solve. The conclusions of this report are adopted.

The following communication has been written to the Editor of the *Moniteur Industriel*, since that journal published a portion of this report:

Bellefleur, April 18, 1845.  
SIR,—At the last meeting of the Academy of Sciences, I heard that, at my request, the report concerning my system of atmospheric railway had been sent back to the commission to make a fresh examination. I hoped, therefore, that you would have delayed the publication of this report; but, as I find the first part in your yesterday's Number, I have the honour of begging you to announce my approaching answer to the objections contained in this report; this answer is ready, but I do not think it will suit my convenience to furnish it to-day. I merely inclose herein an article which ought to terminate it, and which relates to the last phrase of the last note of the report. You will oblige me by inserting it in one of your early Numbers.

At the end of the note which terminates the report, always admitting for the English system the imaginary supposition of a valve absolutely without loss, supposing always in my own loss of 40%, and the total co-efficient of traction of thirteen kil. per ton—that is to say, double what it should be—the following conclusion is found—viz., that, in my system, the engines could only be the ninth part of those in the English system. This reported one-ninth will come down to one-seventeenth, in rectifying the power of the English system, as is mentioned above, from 188 to 349 horse-power. But, even supposing that the proportion must remain one-ninth, will there not always be an immense advantage in employing my system, when besides, by the modifications which I have developed for the method employed in the practicable projects on the St. Germain line, it is plain that my engines will not be heated the same number of hours as those of the English system, and will not have more work at night? And how, when the commission entertained this conviction, adopting against my system all the restrictions which could be imagined, yet always retaining for it the advantage of reducing to a ninth the power of engines necessary for the English system—how can any one conceive this phrase in the report—"It is not allowed us to-day to affirm, if it is really impossible that the English system should fulfil the necessary conditions, for its expense not exceeding that of M. Arnollet's system." But does there exist in the universe, a thing on the subject of which there will not be hereafter some improvements possible? And, because this possibility does exist—perhaps not to be realised for an age—it is necessary, when a certain amelioration is proposed (capable, too, of giving vitality to the atmospheric system), to reject it, in spite of its evidences, and consign it to that melancholy state, where for many years the English system has been seen to languish! What would, then, be the object of the law, which has placed a sum of 1,800,000 f. for the study of a better system?

## ATMOSPHERIC SYSTEM—HALLETTE'S IMPROVEMENTS.

The subject of this novel system, which, with modifications, bids fair eventually to supersede the locomotive principle, having engrossed, of late, such universal attention, we are induced to add to our other valuable information on it, the following interesting translation:—

Mr. Cubitt, as is well known, lately visited the factory of M. Hallette, at Arras, and inspected the machinery employed there, under the appellation of "the French system," professing to be an improvement on the present mode of atmospheric locomotion. Mr. Cubitt is a man possessed of talent far too superior, and of a heart too noble, to have been under the influence of any prejudice, either favourable or unfavourable, in the examination of a system of which he was ignorant. He had only heard of M. Hallette's invention as an ingenious mode of obviating some of the numerous secondary difficulties presenting themselves in the original propo-

sition for propulsion, borrowing its motive power from the atmospheric pressure, difficulties capable of being easily overcome by various means, leaving selection the only embarrassment. Mr. Cubitt's visit to M. Hallette might have been simply one of curiosity or courtesy, attention towards an engineer of acknowledged talent, or, perhaps, he expected to see, at Arras, a play of valves, offering, it may be, some slight improvements on Mr. Samuda's invention; but after a whole day devoted to the minute and profound examination of a branch of line, constructed by M. Hallette, the particular details of which he caught with a quickness and accuracy perfectly amazing, he did not hesitate to declare plainly, his admiration of a system he considered complete, and without those primary objections which were apparent in the original invention; and, at the same time, he regarded the few secondary difficulties presenting themselves in the improvement, as trifling and easily to be overcome. He expressed, generously, a hope that the Government, which had already advanced 1,800,000 francs for the trial of the atmospheric system, would extend its patronage to this modification of it.—(Translated from *l'Annuaire de Boulogne*.)

Notwithstanding these unequivocal marks of approbation, this novel system is not without some serious objections being urged against its minor details. The chief of these appear to be the friction of the piston-rod against the valves, thus producing a loss of force; that of the rod against the sides of the longitudinal cleft, producing an overheating and a violent repulse; and, lastly, the tendency of the valves to reflect, under the influence of the atmospheric pressure, in the interior of the tube where the vacuum exists.

It appears to be clearly defined that the piston rod fulfils two distinct functions; on the one hand it serves to attach the train to the piston, and on the other, to establish a communication between the external air and the tube. It is from this combination, the simplicity of which is likely for a moment to deceive us, that all the inconveniences to which the system is never become a simple connecting bar, but must occasion a vacuum, a part of which allows a supply of sufficient air. Thus, M. Hallette has been led to the construction of two arched plates of one metre in length, revolving their cavity, and presenting in the middle a breadth of about 0.08 metres. To make the piston rod perform these two functions essentially distinct, it was necessary to increase its length and breadth, and it is the influence of these additional dimensions that creates the difficulties we recognise. The better to comprehend our position, we will repeat that the distinctive character of the system consists in the extension of the longitudinal opening by means of two valves pressing against each other (by reason of the condensed air which they enclose); and, consequently, against every thing placed between them. But this pressure, at the instant of motion, produces a friction; and, as it is in this case proportionate to the pressed surface, it follows that the friction is greater as the length is increased. We have tried to give a computation of the loss of travelling thus produced; and, allowing a tension of sixteen centimetres of mercury in the valves, a height of contact of the rod with the lips of four centimetres, we have precisely found that the rod undergoes a pressure expressed by the following formula:— $2 (\text{met. } 04 \times 1 \text{ met. } \times 1.038 \text{ kil. } \times 9.8 \times 1000 \text{ kil.}) = 173 \text{ kil.}$ , the friction of the iron on the leather is, under some unfavourable circumstances, 56-100, and being propelling, lubricated 16-000 of generating pressure; in fact, the extreme cases are  $173 \times 0.56 = 96.88 \text{ kil.}$ , and  $173 \times 0.16 = 27.68 \text{ kil.}$  and for the co-efficient 24-100 that we have above adopted  $173 \times 0.24 = 41.52 \text{ kil.}$  This calculation represents the 5-100 of the pressure exercised by the air over a piston whose surface is 1145 centimetres square, the vacuum being estimated as forced to two-thirds of the atmosphere; and, although the value of this loss of travelling cannot be exaggerated, it will always happen that it will be the more reduced as the length of the rod will find itself proportionately restrained. As to the extent to which the vacuum extends, we think there is a manifest inconvenience. In fact, to preserve its proper stipulated condition, and to leave the necessary play to the rod for its motion and transit, it will be requisite to remove the edges of the grooves; but the tendency of the valves to hurry on under the influence of the atmospheric pressure in the interior of the tube, had compelled the opening of the cleft to be limited to four centimetres, so that there only remained a play on each side of a millimetre, a space evidently too small to prevent overheating and wear. Such was our original objection—of its importance no one can entertain a doubt—indeed we are happy to observe, that Mr. Hallette has himself, perceiving the difficulty, expressed his intention to try and remove it.

After the preceding analysis, the proposition of the ingenious inventor of Arras is very simple. He undertook to release the rack from the action of the valve, to bring it back to the dimensions strictly necessary as a bar of traction, and to find a proper method for applying against the piston, the air necessary for its motion. And this result it is, that Mr. Hallette seems to have arrived at, in the most happy manner; and if we only as successfully explain this novel proposition, it must at once be seen that the invention has arrived at a degree of perfection, to which the English system could never pretend. The new rod is not more than twenty-two centimetres in length, to 0 m. 02 of thickness, instead of 1 m. 038, and the friction, which we have calculated above at 41 kil. 52, is thus reduced to  $0.16 \times 2 (0.04 \times 0.02 \times 1 \text{ kil. } 038 \times 9.8 \times 1000) = 9 \text{ kil. } 13$ —the quantity altogether lost. But the full weight of this modification does not stop here; in reducing the thickness of the rod, and preserving altogether a play of 6 millimetres, the opening will not be found to exceed 26 millimetres in size, thus presenting a double advantage; first, of being sufficiently large to obviate the direct friction of metal against metal, and sufficiently small to prevent the working of the racks in the interior of the tube, which drags and displaces the apparatus, in giving place for the re-entrance of air. It is therefore evident, that by this double reduction, the height of contact of the levers against the rod is very considerably diminished. As for the force of the air, it is effected in a very ingenious manner, by means of special valves, placed on the lateral side of the tube at distances of 500 to 1000 m. These valves are double, and present together an opening and an access in the tube, equal to its section; they are lifted at the passage of the train by one of the boards, which open the valves of entrance and departure, no matter in what direction it proceeds, and they rest in this position, until a jet of air, formed by a cylindrical bellows, constructed like a lantern on paper, causes the escape of the reserve steelyard in a small notch, which it has penetrated. This effect, moreover, can, after a time, be regulated according to the wish of the guard, and ever after open of itself alone, the succeeding valve. We cannot disguise the fact, that the establishment, the keeping it up satisfactorily and in repair, and the action of these new organs, must be new causes of expense; but the atmospheric system is essentially thus—it can only exist by means of a complication of machinery, which is nowhere found on our locomotive railways, and under this conviction, we still maintain our original opinion respecting the introduction of this novel method of propulsion. M. Hallette has ingeniously modified the disposition of his piston. Notwithstanding his reduction of the bulk, he has preserved the power of maintenance at a moderate temperature; the rod and the lower part form a reservoir of oil, which is in combination with a small cover placed under the seat of the conductor of the train; and this reservoir, always full, drops, by means of holes pierced on the upper side, the oil necessary for the lubrication of the piston; and, besides, it possesses the means of putting in communication the interior of the tube of propulsion, with the barometer placed before the engineer, so that he can discover at a moment, the degree of vacuum at his disposal.

We have nothing to say respecting the three small valves, intended to give access to the atmospheric air, to the passage of the piston, to the moderation of the speed, or for completely stopping it—they have not undergone a single change since our last description. Such cannot be said of the arrangement of the piston, properly so called: the leather plates, formed diamond-shape, and producing only an imperfect security, M. Hallette has superseded with advantage, by the substitution of strong straps of leather, solidly fixed, and pressed against the partitions of the tube of propulsion, by the aid of an annular pad, of impenetrable composition, filled with air, so that the engineer compresses it from time to time. To this effect he has at his command a rod, fastened to a pedal, on which he rests his foot, and which raises up the metallic piston, so that it glides by friction, in a small metal cylinder, at the bottom of which a valve is fitted, opening from the exterior to the inside, consequently, when the piston is raised, the cylinder is filled with air, so that the weight of the piston immediately compresses, by a small tube of communication, in the pneumatic apparatus.

Mr. Cubitt, the celebrated English engineer, has lately visited the road on which the system is experimented at Arras, and the disposition of this piston apparatus seemed to him to promise results so superior to that usually employed, that he did not hesitate to give M. Hallette the order for a complete piston, on the dimensions shown to him. As for us, we delay giving any opinion, until experience has sanctioned a system which,



in theory, certainly seems promising. Such are the different modifications which M. Hallette has made in his system since December last. We do not doubt their efficacy, but we should wish that satisfactory experiments should be instituted, to elicit the report of the commission charged by the Minister of Public Works with the examination of M. Hallette's experiments. We await, with intense anxiety, the result of the labours of MM. Belanger, Mallett, Beaudé, &c.

#### PILBROW'S ATMOSPHERIC RAILWAY.

The great and absorbing topic of the day in the commercial world is expedition in travelling, and this has no parallel, except the Maynooth question in the religio-political world. The great rivalry now is, for the method which shall combine the greatest expedition with the greatest economy, and exemption from liability to accident; and this latter qualification has become more and more a desideratum, since the accidents which have occurred of late have been so numerous, and attended with such fearful consequences. The timid travellers have had their nervous system tortured by the accounts they have read in the public journals of collision of carriages, bursting of boilers, and ignited trains, alarming and distressing, if not otherwise injuring, the passengers. Now, there are some accidents unavoidable, and may possibly occur under the best systems, administered in the best possible manner; but, as there are accidents which may be avoided—since those accidents arise from causes which need never be called into existence—an invention which entirely excludes many, and the most injurious, classes of causes of accidents, well deserves the patronage and confidence of the public. This patronage and confidence seem to be increasingly given to Pilbrow's atmospheric mode of travelling on rails similar to the present lines now worked by locomotive-power; and as it is impossible, from the very nature of the invention, that two carriages can be travelling in opposite directions on the same line, the possibility of accident from collision is entirely precluded—the carriages being carried forward by a rack from the centre, running off the line is prevented. As no boiler nor steam is used, the bursting of any part of the apparatus cannot, under any imaginable circumstances, occur. Since fire is an agent entirely excluded from any connection with the train, the ignition of the train, smoke, flakes of oxidised iron, and sulphurous vapours, cannot be reasonably dreaded. These are some of the negative advantages of this invention, and the more frequently we examine the model, the more we are convinced that this new mode of travelling will soon become universal. Expedition in travelling cannot be secured in some parts of the world by any other method, especially those parts where water and coal cannot be obtained; but even in the *Desert*, where there is no water, there is air in abundance for working this machinery.

At the Institution of Civil Engineers, on Tuesday last, the discussion upon the Atmospheric Railway System was again renewed, and continued throughout the evening [see *Mining Journal* of last week]. The principle of the basis of Mr. Stephenson's calculations, that the maximum uniform or mean velocity was attained, appeared to be conceded; but a question had been raised upon what was termed an inconsistency in the experiments, which was, the attainment of a steady height of barometer, with an accelerating velocity. In order to substantiate the view, that a maximum velocity had never been attained, the steady height of the barometer, and the principal therein involved, was disputed; while an acceleration, made up by grouping a number of velocities registered in the table, was advanced as an inconsistency, amounting to a proof, that the height of the barometer could not have been steady. The fallacy resulting from any arbitrary grouping of these registered velocities, in any of which an error of eight miles per hour might exist, was shown by a comparative analysis of the grouping. If column No. 4, in the tabulated experiments, was grouped into divisions, of five observations in each, an acceleration of 1.60 would be shown; but, if the division be made into groups of four observations in each, a retardation of .8 would result. This clearly showed that either an accumulation or a retardation might be established from the same figures, depending upon the method of grouping them, which was entirely arbitrary. This test, therefore, of the amount of acceleration was considered nugatory. On the other hand, it was proved, from the experiments of Mr. Stephenson and his assistants, corroborated by those of Mr. Bidder, that a perfectly steady height of barometer was maintained, and could be observed with the greatest accuracy, where there was nearly a balance between the power and the resistance, and therefore no forces were in operation to cause an accumulation of the mercury. As to the comparison, between starting with a low amount of vacuum, and the getting up the steam under a locomotive, and then starting as soon as the steam would move the piston, it was contended, that the raising the steam of the fixed engine ought equally to be taken as an element in the comparison of the time required to attain a maximum speed by locomotives on the ordinary railways; it was shown, that it was rather a chemical, than a mechanical, question, depending upon the intensity of the combustion in the fire-box, which would be at a minimum when the engine was stationary, and that it required a certain time to produce a sufficient amount of combustion to attain velocity. Therefore, the comparison was not admissible. A balance, by figures, was established by Mr. Bidder, of the power given out, and that observed by each of the resistances: from which balance the amount due to acceleration was ascertained; and it was shown, that this amount could only cause a certain amount of acceleration, which was all given out before the end of the experiments at Dalkey; and while the barometer was nearly uniform, the acceleration was little more than was due to the progressive diminution of leakage. The mode of conducting the experiments, with the instructions given and acted upon, were explained by Mr. Berkley, and fully corroborated all Mr. Stephenson's previous statements. Allusion was made to the experiments instituted by the British Association upon the resistance of trains descending inclines, when it was shown, that the results of allowing a locomotive to descend the incline by its own gravity, or by dispatching a train of four carriages down, under the same circumstances, were identical. Several other points were entered upon, but their final discussion was adjourned until Tuesday the 29th inst.

#### ARMAGH, COLERAINE, AND PORTLUSH RAILWAY.

##### ENGINEERS' REPORT.

Having now completed the survey of the Armagh, Coleraine, and Portlush Railway, I have to lay before you the result, with a general summary of the traffic to be expected, and description of the country traversed by the proposed line. It will be seen by the accompanying map, that this line of railway is that portion of the Great Northern Trunk Railway from Dublin to the northern coast, lying between the city of Armagh and the harbour of Portlush. It is unquestionably the most important trunk line in Ireland, not excepting the Dublin and Cashel; it connects the most important towns, the wealthiest counties, and the only manufacturing district in Ireland with the metropolis; a stream of traffic, both of goods and passengers, flows in this direction, unsurpassed in magnitude in Ireland. The first portion of this trunk, from Dublin to Drogheda, is already in successful operation, and the traffic on this part far exceeds the expectation of the projectors. Notwithstanding the heavy expenses of an opposition, and the struggle through the years of mercantile depression that followed the passing of the Act, the shares are now selling at 93½, the amount paid being 60½. The second portion of the trunk, from Drogheda to Portlough, on the Ulster Railway, near Armagh, is now being applied for to Parliament, having received the recommendation of the Board of Trade; and the portion now under consideration extends from Armagh to Portlough on the extreme north coast, being the nearest Irish port to Ardrossan, Greenock, and Glasgow, and that part of Scotland.

In selecting the line, my primary object has been to pass through the numerous and important towns lying between the termini I have named, with as little deviation from a direct route as may be, and this has been attained in a greater degree than I expected on the first examination. The line selected commences at Armagh, near the Fever Hospital, having a common station and communication with the Ulster Railway, and with the Newry and Enniskillen Railway, affording a continuous line to Belfast, Dublin, and Enniskillen, and the entire north-west of Ireland, effecting a saving in cost of construction and working expenses by its joint use by all the three companies. This terminal station is as near as is desirable to the centre of the city, and does not unnecessarily interfere with any house or other valuable property. The line proceeds thence, through Blackwater, crossing the River Blackwater and the Ulster Canal, to Moy and Charlemont, all rising and populous towns, Charlemont being a military fortification and depot of some extent; thence diverging slightly to the west, it touches on Dungannon, a very important town, returning a member to Parliament; it is the centre of a rich agricultural district, and a very large amount of business in the sale of produce, and also of flax, linen, and yarn, is transacted. Here are also quarries of limestone, much used for building and manure in other parts of the country; from Dungannon it returns to the direct line by a divergence to the east, thus forming a loop, but which the great importance of Dungannon fully justifies me in doing.

Immediately after returning to the direct line, it passes through Coal Island, a small town, but of the greatest importance, from its being the centre of the Tyrone coal-field, and of the manufacturing district, which the cheapness of fuel has collected here. The coal-fields abound in manufactures of agricultural implements, paper manufactories, potteries, fire goods, &c. The population is, consequently, very dense. The Tyrone coal-field is described by Kane, in his *Industrial Resources of Ireland*, as being of very great richness, the beds varying in thickness from twenty-two to thirty-two feet of workable coal; it burns brightly, and emits a great heat. I confidently expect a large coal traffic, and that the coal-field will be benefited in a great degree. Leaving Coal Island, the line passes through Stewartstown, a very important town, and the centre of a fine district, where very large quantities of agricultural produce and general merchandise are sold for shipment. From Stewartstown the line diverges to the west to Cookstown, another large and flourishing town, where, last year, no less than 7000 tons of flax were sold for shipment; the neighbourhood is highly cultivated, rich, and populous. Diverging again to the east, it enters the property of the Worshipful the Drapers' Company of London, whose estates, managed by Mr. Miller, of Moneymore, present a model of excellent management; passing through Moneymore—a beautiful town and daily increasing in importance—to Magherafelt and Castle Dawson, where there is a large cotton factory; thence through Bellaghy and Portlough, by the valley of the Bann, to Kileara, the estate of the Mercers' Company; and here crossing the Bann and proceeding to Ballymoney, a most flourishing town, in the immediate neighbourhood of which are large mills and distilleries, a junction takes place between the line of this company and the extension of the Belfast and Ballymena, diminishing the expense of construction and maintenance one-half—an object of considerable importance. The borough of Coleraine is a large manufacturing town, returning one Member to Parliament; it is the centre of a very rich and populous country, to which the produce converges for shipping. From Coleraine the line passes to the salubrious and fashionable watering-place of Portstewart, much frequented by gentry from all parts of the country; it has more than doubled its population within the last ten years; thence the line passes to Portrush, and ends in connection with the harbour, a distance of seventy-two miles from Armagh, and 165 from Dublin. From the foregoing statement it will be seen that the railway will pass through eighteen towns, in all of which are held weekly markets and numerous fairs, and it will also pass contiguous to, and accommodate the trade of the towns of, Toome, Coagh, Desert Martin, Tobermore, Maghera, Swatragh, and Garvagh, together twenty-six towns, and all of importance, in a distance of seventy-two miles, a fact unprecedented in the history of railways. The district of country through which it passes is beyond question the richest and most populous in Ireland; the Railway Commissioners state the population varies from 350 to 440 per square mile, a density of population not equalled in any district of the same extent in the United Kingdom; and it must be remembered that this enumeration took place seven years ago, since which time it has much increased. This large population is easily accounted for; the north of Ireland is a great manufacturing district; large quantities of linen and yarn being here spun and woven, great attention is paid to the culture of flax, which is fast attaining perfection, and is rapidly increasing; the country is everywhere studded with bleach-works, manufacturing linen of the first quality, which commands a ready sale and the highest price in the English and foreign markets.

A considerable portion of the land is the property of the London Companies, whose resident agents pay great attention to the improvement of their estates, and the happiness and welfare of their tenantry. The principal landlords are resident, and the people are moral, industrious, and comparatively wealthy; agriculture is followed after the most improved methods, and, in a short time, the country will be second to none in its agricultural improvements and manufactures. It is evident from the above statement of facts, that the materials for a very large traffic exist along the line, and it is so circumstanced, that there is no competing water carriage or railway, nor can there ever be; all the work is performed by carriers, whose usual rate of carriage is 6d. per ton per mile for heavy goods; in proportion for other goods. It is, therefore, evident that all existing trade must pass by railway, independent of the increase consequent on the establishment of this mode of conveyance; and I will venture to assert, that in no district has a railway been established, where the increase will be apparent in a shorter time or greater in quantity. When we consider the amazing quantity of agricultural produce sold in the different towns, on or adjacent to the line proposed, the quantity of foreign produce, cloths, hardware, building materials, &c., necessary for the supply of the dense population—Dungannon alone exporting and importing, according to the returns of the actual sales made, upwards of 20,000 tons annually, Cookstown 15,000, Ballymoney 6000, Coleraine 22,000, and the other twenty-two towns in proportion; add to this the linen annually bleached, the trade in coals, potteries, &c., &c.—it is not too much to assume that 200,000 tons of goods will be carried over thirty-three miles annually; many persons, well acquainted with the district, affirm that 300,000 tons would be a much nearer estimate; but I do not like to appear as over estimating the quantity. The returns I have mentioned have been obtained from the clerk of the markets, of the sales that have actually taken place for shipments, and authentic returns are now in preparation for the remaining towns; these will decide to a degree of nicety the actual existing trade, and I think it will not be less than I have stated, without any allowance for the increase. Two other sources of revenue will also be available in the carriage of salmon, during the season, from the fisheries of the Cutts and Cranagh, both of which are adjacent to the line; and the fish can be conveyed in a few hours, and in a fresh state, to the inland markets. The deep-sea fishing off the northern coast, now comparatively little used for want of markets, will be much benefited, and a cheap supply of wholesome and nutritious food would be available to the dense population before referred to, and the carriage will prove of considerable value to the railway. For the passenger traffic I have not the same data to calculate from, but there is sufficient to show that it will prove highly remunerative; for if we assume the line to be used by the inhabitants for ten miles on each side, the number of persons will, including the towns, be 500,000, who will use it for greater or less distances. This is only the local traffic, and does not include the traffic from Dublin to Londonderry, all of which will pass over the line, nor from Coleraine to Belfast; nor does it include the tourists from all parts of England and Ireland to the magnificent scenery of the Giant's Causeway and adjacent coast, as well as visitors to, and residents at, the beautiful watering-places of Portstewart and Portrush, nor those conveyed by excursion trains, nor the four-fold increase always consequent on the establishment by railway of cheap and rapid conveyance—all fruitful sources of revenue, but which I have not the means of correctly estimating. From the data before me, I have no doubt whatever, if the fares be low, as they ought to be, that the numbers moved each year will amount to 250,000 for the entire length of the line, at an average fare of 3d. per mile.

The conveyance of mails will, at the usual rate, amount to 720l. per annum, and, according to the usual mode of calculation, parcels, private carriages, &c., will amount to 2000l. more; and a very considerable revenue will arise from the conveyance of live stock to Portrush, for shipment to the Glasgow and Liverpool markets. The conveyance of troops, ammunition, &c., so confidently relied on as a source of revenue in the lines of railway in the southern districts of Ireland, will, from the peaceable nature of the inhabitants here, not be available; for, as was aptly remarked by one of the speakers at a public meeting relating to this railway, at Ballymoney, "A soldier is a wonder for children to look at in this part of the country." With respect to the engineering character of the line, it is as easily constructed a railway as any in this country; the greatest facilities exist, and the country is very level; the gradients will be very easy, they not in any case, excepting at Dungannon, exceeding 1 in 330, and that only for a very short distance; the general character approaches to a level for all practical purposes. The earth work is very light, the only portions of any magnitude being over the Blackwater and the Bann at Kileara, and yet these are far from being of even ordinary magnitude. In fact, looking to the extent of the line, I do not know where a railway could be so cheaply constructed; and if a single line be adopted, it may be constructed and completely set to work for a sum much below the estimated amount of 9000l. per mile. The detailed estimates will be shortly completed, when they shall be laid before you. The expense of working a line with such excellent gradients will be comparatively slight; I have taken it at one-third the gross receipts, and I am certain it will not be exceeded. The harbour of Portrush, at one of the termini of the line, is the natural outlet of the entire of the district traversed by the line; it is formed by a projecting headland called Ruammore, and by an artificial breakwater. This harbour is not yet finished; it was begun by a private company of merchants of Coleraine, who, feeling the great risk of crossing the bar at the mouth of the River Bann, which was daily getting worse, formed a company, obtained an Act of Parliament, and, by economical management of their own funds, succeeded in making an useful harbour, and they are now receiving 6 per cent. for their outlay—ample proof that enterprise in this district is sure to be recompensed. Adjacent to this harbour lie the Skerries, a series of small islands distant a quarter of a mile from the shore, forming a natural breakwater nearly three miles in extent, and also the most magnificent safety harbour in the world, accessible with all winds and at all times of the tide, with good holding ground, and depth of water sufficient to float the largest vessels, and space where the entire navy of England might ride in safety.

The importance of this as a naval station, during war, cannot be over-estimated; there is no port where ships of war could ride so securely, or be so easily available at a moment's notice; and being, by the railway, within six hours of Dublin, its importance, as a naval station, cannot be over-valued. In a commercial point of view, it is equally important for being the nearest Irish port to Ardrossan, Greenock, and Glasgow, to which places there is daily communication; it will, when connected with the interior by the proposed line, be the port of shipment for that country, for the entire of the district traversed by it, and its value be proportionally enhanced. It is impossible to conceive the benefits that this line will confer on the country and its inhabitants; they are apparent to every one at all conversant with railway traffic—who is not? and in the case under consideration, I am strongly of opinion that the benefits to be derived from it to all parties will far exceed the most sanguine expectations of the projectors.

WILLIAM MACKENZIE.

5, Warwick-square, Belgrave-road, March 25.

#### DEVON AND CORNWALL CENTRAL RAILWAY.

An adjourned meeting of this company was held at the offices, Old Broad-street, on Tuesday, the 22d inst., to receive the report of Messrs. Turner, Snow, and Hammock, the three gentlemen appointed as a deputation to confer with the Coast Company.—On the motion of EDMUND TURNER, Esq., M.P., Mr. CLEMENTS was called to the chair.—Mr. TURNER, in stating the result of the negotiations, produced an agreement, which, after mature and protracted deliberations, had been drawn up with the approval of each party. It, in effect, stipulated that the Central Company should withdraw all opposition to the Coast Line, on the latter placing at their disposal 1750 shares at par, to be returned at market price, in the event of any of the conditions being broken. Had as these terms might appear, he (Mr. Turner) could assure the meeting they had not been obtained without the most unremitting perseverance on the part of the deputation. They had hoped that 2500 shares would, at the least, have been procured; however, the most advantageous bargain which they could obtain, under the circumstances, had been concluded; the requirements of the agreement had already been acted on; the opposition of their secretary, Mr. Harvey, had been withdrawn, and the Parliamentary agents had received notice that the petition against the Coast Line would not be proceeded with. The greatest difficulty that had been anticipated, was the division of the shares thus accorded them, among the proprietors of the old company. The number of shares in the latter amounted to 22,238, and the deputation felt reluctance in determining the allotment of the new shares; they, therefore, resolved to refer that subject to the decision of two gentlemen wholly unconnected with, and disinterested in, either project.—Mr. Michael Williams and Mr. Frederick Ricketts—and, in the event of their disagreeing, to confer further with Mr. John Vivian; the two former gentlemen, however, concurred in a recommendation that the 1750 new shares should be apportioned rateably to all the proprietors of the Central Company; this proposition, though presenting many most serious difficulties, the deputation, wishing to afford the smallest shareholder the same benefit as the larger capitalist, had determined to carry fully into effect. Considering, then, that the number of shares held in the Central Line amounted to 22,238, and those conceded in the Coast only 1750, the allotment would be at the rate of 7½ per 100 shares. Those that held very small amounts, such as four, six, or ten, of whom he regretted there were a great many, must arrange among themselves respecting the distribution of their shares, and divide among themselves any profit which might arise by the receipt of any number to which their united investment might entitle them. The amount of deposit would be 8l. a share, and it only required the sanction of the meeting to ratify the agreement.—A series of resolutions were then submitted, embodying the features of the negotiation, and being put *seriatim* to the meeting.—Mr. TILLY (their solicitor), on behalf of the Cornish proprietors, urged that, as the opposition which they had commenced, and always strenuously maintained, against the Coast Line, had procured for the company the benefit of 1750 shares, representing more than 5000l., or upwards of 50 per cent. of their liabilities, which amounted to 9500l., the remaining debt of 1741l., which would remain after all their assets had been obtained, should be partly borne by Mr. Turner and his friends, and not fall exclusively on the Cornish proprietors. Should this course not be adopted, proceedings must be taken at law to obtain justice for those shareholders, and which would be very prejudicial to the interests of every one connected with the company. Mr. Tilly made many very fair suggestions for an amicable arrangement, all of which were, however, pertinaciously rejected by Mr. Turner.—Several gentlemen also proposed methods for meeting the Cornish shareholders in a friendly and honourable spirit, but the hon. Member for Truro, notwithstanding the protest of several proprietors against being dictated to by him, refused to listen to any terms except those he had mentioned.—A long and very excited discussion ensued, Mr. Tilly and various gentlemen claiming justice for those who had paid their deposits, from those who had not advanced one farthing; and loudly complaining of Mr. Turner's conduct, in affecting to consult the interests of the company at his own sacrifice, while, in reality, he was wholly bent upon his own advantage. It was eventually agreed that the indemnity proposed by Mr. Turner to protect him and his friends should be expunged, and that the London shareholders would advance 741l. out of the 1741l. against the company—leaving the remaining 1000l. to be subscribed by the Cornish proprietors.—A vote of thanks was then passed to the chair; and the meeting, after a desultory discussion of nearly four hours, broke up.

#### NORTH WALES MINERAL RAILWAY.

A special general meeting of the shareholders in this company was held at the London Coffee-house, on Wednesday, the 23d inst.—Mr. WARDELL, in the chair.—The meeting was called for the purpose of sanctioning the application to Parliament for continuing the extension line from Ruabon to Cefn Mawr, and for general purposes.—The advertisement convening the meeting having been read, the secretary read the following directors' report:—

The portion of the Ruabon Extension Railway, which this meeting has been called to consider, extends from the fifth mile to Cefn Mawr, a distance of one mile fifteen chains, or thereabouts. This part of the line was originally laid out to receive the mineral traffic from the British Iron-works, the Cefn Collieries, and other extensive works in the district. After the terminus had been fixed and the Parliamentary notices given, the Shrewsbury, Oswestry, and Chester Junction Company was formed for the purpose of making a railway from that point to Shrewsbury—thus completing the railway communication between Chester and Shrewsbury, and the intermediate districts. On investigation it was found that, to effect a junction with this line, a considerable alteration in the level of the mineral extension line at Cefn Mawr would be necessary, and, consequently, a large additional expenditure would be required; it became, therefore, a matter of discussion whether the portion of the line involving increased expense should be made by the North Wales Mineral or by the Shrewsbury Company, and a negotiation was accordingly opened with the provisional committee of that company, who made an offer to take that portion of the line upon themselves, or take so much of the cutting as would amount to the sum of 10,000l., for the purpose of completing their embankment at the viaduct. This sum, along with the saving arising from the diminished quantity of land required for spoil, according to the estimate of the engineer, reduces the total cost of forming this last portion of the line to 35,000l. By deducting 15,000l. for the cost of this portion of the line, if made according to the original intention of the company, there remains 20,000l. as the extra cost of forming a junction with the Shrewsbury, Oswestry, and Chester Junction Railway. Looking to the important additional traffic which the connection with the Shrewsbury line will occasion, and to the mineral traffic in the immediate vicinity of Cefn Mawr, the directors strongly recommend the proprietors to authorise them to complete the line, according to the improved plan, feeling confident that they will be amply remunerated for any additional expense incurred. The directors deem it necessary to add, that there is a prospect of diminishing this expense very materially by a deviation which has been proposed since the Parliamentary plans have been lodged, and for which they are endeavouring to effect arrangements with parties favourable to the line, which they have little doubt they shall be able to carry out.

The CHAIRMAN then moved the adoption of the report, when several proprietors alluded to the inefficiency of the proposed sum of 20,000l., for the purpose of defraying the cost of the proposed extension, one gentleman declaring his belief that 80,000l. would be required for the purpose.—The CHAIRMAN observed, he thought the gentleman must mean 18,000l.; but the PROPRIETOR assured the meeting he meant what he had stated, and he feared the shareholders would discover that the cost would not be less.—Another PROPRIETOR considered the proposed extension would greatly injure the company, and could not be carried out for the proposed amount.—The CHAIRMAN, however, assured the meeting that the engineer of the Oswestry and Shrewsbury line had carefully examined the ground, and was satisfied the outlay would not exceed the estimated amount; and, further, that one of the most eminent contractors of the day had offered to complete the works for the proposed sum.—The report was then adopted; and thanks having been voted to the chairman, the meeting separated.

DUBLIN AND KILKENNY RAILWAY.—A meeting of the scripholders of this company was advertised for Wednesday last. A few gentlemen having met at the London Tavern, Mr. Horseman took the chair; but, in consequence of the extreme paucity of attendance, a formal resolution was passed, that a deputation of the scripholders of the company should meet the registered shareholders on Saturday next, and urge them to suspend their negotiations until after the 2d of May, to which day that meeting stood adjourned. The meeting accordingly separated, being adjourned till Friday next.

WELSH MIDLAND RAILWAY.—This line purposes, as we briefly mentioned in last week's *Mining Journal*, to connect the vast mineral districts and seaports of South Wales, in the Bristol Channel, with Birmingham and the great manufacturing districts of Staffordshire; besides uniting them with the whole of the midland and other railways of the kingdom. A direct and easy communication will thus be kept up between the great mineral districts of Staffordshire, the salt district of Worcestershire, the manufacturing districts of Lancashire, Yorkshire, Worcestershire, Warwickshire, and the seaport of Liverpool, the most extensive in Great Britain. It will afford, also, the whole of South Wales, and a large portion of North Wales, Herefordshire, and Devon, the shortest railway communication with the northern and midland parts of the kingdom, and, to a certain extent, with London; as the Welsh Midland Railway must, at no distant period, become connected, by important branches, with the whole of the manufacturing districts of Monmouthshire and Glamorganshire. It will open at Swansea an outlet for the produce of the northern and midland counties, that port being within 132 miles of Birmingham, and it already remarkable for the tonnage amount of its exports and imports; and it will develop most advantageously the vast mineral resources, consisting of copper, iron, tin, plates, and spelter, of the rich metallurgical fields of Wales, by offering an increased facility for conveyance and exportation. To these advantageous features, which we last week more prominently noticed, may be added the great saving in distance which this line will necessarily effect, between the Welsh localities and the north. When this project is completed, it will bring Swansea within 104 miles of Worcestershire, and as even, by the proposed South Wales line, it would not be less than 133 miles, a saving would be effected of nearly 30 miles. But between other towns and Liverpool and the north, this result is even more apparent: from Ynyscedwyn and Ystalyfera to Worcester, the distance will be reduced from 142 to 92 miles, showing a difference of 50 miles; from Merthyr to the north from 110 to 77, or a difference of 33; from Caermerthion to Worcester from 162 to 109, or a difference of 53 miles; from Llandilo to the north from 165 to 96, or a difference of 69; from



Llandovery to Worcester from 177 to 88, or a difference of 94 miles; from Llandovery to Liverpool from 262 to 193, or a difference of 69 miles; from Llandovery to the same from 274 to 180, or a difference of 94 miles; and from Caermarthen to the same port of Liverpool, from 259 to 206, showing a difference in favour of the Welsh Midland over the proposed South Wales line of 53 miles. When such indisputable advantages are presented, coupled, at the same time, with superiority, as regards gradients, and the nature of the work, presenting engineering difficulties of a very insignificant character, although travelling through a district generally pregnant with the most formidable obstacles, and, therefore, entailing great trouble and increased expense, the superior title of this line must be immediately perceived. In fact, we should say, without hesitation, that a more beneficial and *bona fide* undertaking, entailing advantages not only to the company, as capitalists, but to the locality, as more immediately benefited by the facilities for traffic and communication, has scarcely been hitherto devised.

**WORCESTER, SHREWSBURY, AND CREWE UNION RAILWAY.**—This project, purporting to form a junction, at Stourport, with the London, Worcester, and South Staffordshire Railway, passing up the valley of the Severn, and through the immediate neighbourhood of Bewdley, Kidderminster, Bridgenorth, Much Wenlock, Madeley, Ironbridge, Coalbrook Dale, to Shrewsbury, and thence near Market Drayton, Audlem, and Nantwich, to Crewe, where it will terminate by a junction with the Manchester and Birmingham, and Grand Junction Railways, will—whether viewed as a great public undertaking, or a means of private investment—present advantages seldom surpassed in similar undertakings. But, besides the above populous and important localities, which it directly benefits, its remote advantages to other districts, now entirely destitute of railway accommodation, will be equally and permanently decided—forming, as it will, the shortest route from the north of England, Manchester, Liverpool, Ireland, Holyhead, North Wales, and Chester, to Worcester, Cheltenham, Gloucester, South Wales, Bristol, Bath, Exeter, and the south-western counties, connecting also the northern and midland counties with the centre of Wales, its advantages will not be confined to any particular district for local convenience or private speculation; but creating a widely-extended opportunity for commerce, and an increased facility for its transit, it will confer benefits of national importance, participated in also by Ireland, and even, by collateral communication, with several trading ports on the continent. But, while recognising these indirect, but manifestly important, advantages, we are not insensible to the vast local benefits it must unquestionably confer, and that, too, in a district where, from its own rich resources, the development of, or opportunities for, increased transit, would be doubly valuable. Thus, the minerals of the extensive and rapidly increasing iron-works of Shropshire, at the present moment rendered of immense value by the impetus given to that trade, will, by their speedy transport to the various markets of consumption, and the numerous neighbouring localities requiring the produce, either for hardware or railway purposes, find readier access and increased demand, besides accommodating, to a much greater extent, the districts to which it is transmitted. The salt-works of Cheshire, as well as the immense agricultural produce from the adjacent counties and Herefordshire, together with the immense traffic from the centre of Wales and the midland counties, will be more effectually opened up, and reaching the markets of Lancashire, Worcestershire, Gloucestershire, Devonshire and Cornwall, by a rapid and economical transit, be enhanced in value, and require additional labour to meet an increased demand. The works, from the nature of the districts through which they will be constructed, must necessarily be light and easy; and this, combined with the vast through traffic, and probably considerable passenger communication, will render the undertaking both a profitable investment, and an invaluable acquisition to the commercial and social accommodation of the public.

**ESSEX AND SUFFOLK RAILWAY—EXTENSION OF THE LINE AND INCREASE OF CAPITAL.**—This line (originally projected to connect the two counties by means of a rail starting from the Norwich and Brandon Railway at Thetford, by Bury St. Edmund's, Lavenham, Sudbury, Halstead, and Braintree, to the Eastern Counties line at Chelmsford, and thence to Maldon) having met with considerable favour from the public, it is now proposed to extend, by branches from its main route, near Sudbury, to Cavendish and the important town of Clare. The levels of the country are highly favourable to the undertaking, and the actual existing traffic is sufficient to warrant the enterprise, besides the inducements offered by the material increase that will inevitably arise, from placing the rich agricultural inland district in direct communication with a navigable river. The goods' traffic, independently of passengers, will be considerably increased by the large additional quantities of coal, chalk, manure, timber, iron, and other heavy and bulky merchandise, which will thus be imported at a cheap rate into the whole of the surrounding country. As this proposed branch will afford a direct means of effecting a junction with the London and Norwich Direct Railway, near Sturmer, should the latter be sanctioned by Parliament (a contingency scarcely possible, after the unfavourable report of the Board of Trade), the rest of the line from Sudbury to Thetford would be abandoned by the company, and the capital subscribed for its construction returned. A direct communication would, however, in that event, be still preserved between the populous towns of Sudbury, Halstead, Braintree, and the metropolis, as well as Chelmsford and the whole of East Essex to Norwich, while the important through traffic would still be retained. The importance of this step, both to the company itself, and to the prosperity of the neighbourhood, it would be almost impossible to overrate; and it is one of the convincing proofs how great advantages must result, not only to our manufactures, but to agriculture, from the increased facilities of railway communication. To meet the expenses of the proposed branch, and to provide against any increase in the original estimates from the rise in the price of iron, the company have created 10,000 additional shares, which are to be offered in the first instance to the holders of the present shares. We should imagine these will be at once applied for by the present subscribers; but, if not, we think those who were not fortunate enough to obtain an allotment on the previous distribution, should have a preference over the public at large. The shares, however, have not appeared much in the market, and it is understood, they are held by parties locally interested, and the shareholders in the Eastern Counties, and Norwich and Brandon lines, to which this undertaking will ultimately become of the utmost importance. We observe that the engineer to the Eastern Counties line is also the consulting engineer to this company, which is a sufficient evidence of the support it will meet with from that now powerful body.

**NEWPORT, ABERGAVENNY, AND HEREFORD RAILWAY.**—As we stated in our last, this line will, in connection with others, bring into direct communication the vast mineral fields of Monmouthshire, Cardiff, and Merthyr Tydfil, with Birmingham and the whole northern and midland districts of England—at the same time offering to the latter localities a ready channel for the transmission of their manufactures to the mineral population of South Wales. It will commence at Newport, and proceed northward by Pontypool and Abergavenny to Hereford, where it will terminate. From Abergavenny a branch will run eastward to Monmouth and another westward to Brecon; from this latter town an extension will be made to Merthyr, joining the Taff Vale Railway, and ending at Cardiff—effecting a complete intercommunication between all the important towns of Wales, and also presenting the most convenient route to the south of Ireland.

**EAST COAST RAILWAY.**—The object of this line is to supply an important link in a communication, connecting the town of Great Yarmouth and the eastern coast of the kingdom, with the western, northern, and midland districts accommodating in its progress the city of Norwich and a large group of important towns; it will commence at the proposed terminus of the Lynn and Dereham line, and proceed by Holbeach to Boston, where it will form a connection with the Cambridge and Lincoln line; and, if extended, as proposed, to Spalding, will there join another branch of the same railway. It will thus be immediately perceived that the projected lines will in conjunction, at once, benefit themselves, and accommodate the various neighbouring localities, with a direct communication with each other.

**CAMBRIDGE AND OXFORD RAILWAY.**—The object of this prominent line is to supply the only link wanting in the grand chain of communication between the extreme eastern and extreme western parts of the kingdom, to connect more intimately the universities of Cambridge and Oxford, by affording a rapid and easy communication, and a saving of sixteen miles over the old coach road, and to supply the several towns of Royston, Baldock, Hitchin, Luton, Dunstable, Aylesbury, and Thame, with improved means of intercourse, besides affording them increased facilities for communicating with the metropolis and the north. This locality has been, as yet, almost entirely devoid of railway accommodation, while it has never been supplied with any inland water navigation; the cost of coals, timber, iron, and other prime necessities, is, consequently, very high, and the greatest inconvenience arises to the community from their necessarily partial supply. The projected line will open the most direct route for the exchange and transmission of the imports from the northern and eastern parts of Europe at Ipswich, Yarmouth, Lynn, and Hull, with the shipments from Ireland, the Mediterranean, America, and the East and West Indies, received at Bristol, Gloucester, and Plymouth; and will also afford great advantages of economy and rapidity of transit to the manufactures and demands of Norwich, as well as the produce of the West of England.

**HAYLE BAR, CORNWALL.**—Your readers are, doubtless, well aware of the energy and enterprise displayed by the two companies at Hayle, in rendering the harbour or river navigable. To-day I saw a vessel on the bar in St. Ives Bay, near the entrance into Hayle River, and where it appears she must remain till the next flood tide; but I suppose "John Bull must pay for all" these losses. Might not some of our Government barges, with convicts or free men, be well employed in dredging, or something of the sort, for public benefit in similar marine localities?—Railways, without more harbour entrance improvements, will want highways to the ocean, and, therefore, to the world.

Pennance, April 17.

ALFRED T. J. MARTIN.

## RAILROADS IN SPAIN.

Sir,—If your correspondent, the "Idler in the Asturias," be not a man of learning, he certainly is of wit, if he be not logical, he is dogmatical; if he is devoid of argument, he possesses eloquence; and, if he has not the sublime, he commands the ridiculous. Let us look, Sir, at his last production; the letter of the 5th April, written, it is said, in contradiction to the statements I briefly made in my article, which appeared in your columns of the 15th March, touching the inhabitants and Government of Spain, and more especially on the productions of the northern provinces, as affecting the Royal North of Spain Railroad. At one time we have "the Idler" reclining upon the green sward, under the umbrageous branches of an oak, when the "sunny rays are shining," "picking vermin, and squatting (I should have said), like Esquimaux, eating beastly potheria with wooden spoons;" then we have his shafts of wit (copied, no doubt, from *Punch*), directed to a certain "Talacro and St. Stephen, Walbrook,"—whilst he continues in strains of loquacious dogmatism, attempting the support of statements, framed either from ignorance, delusion, or perversion of facts. I can only account for this, by imputing to the "Idler" a sentiment, which, doubtless, gave itself expression to him, when he wrote the above, in the following:—

I must have liberty  
Withal—as large a charter as the wind,  
To blow on whom I please—for so fools have;  
And they that are most galled with my folly,  
They must must laugh.

With these remarks, I will pass on to the subject of most importance to you and to your readers. In considering the introduction of projects such as railroads in any country, there are two points of primary attention presenting themselves. The first, the probability of the governing power; next, the inhabitants and produce. My present will be devoted to these topics, and I beg your readers to connect the remarks I may here make, with those in my letter, in p. 97, No. 409 of your Journal. In that I defended the Government of Spain against the imprecations laid against it; and, much as every one must deplore the sad extremities to which it has been driven, in support of public order, they cannot be indifferent to the crimes which called down the vengeance of the Government on the heads of the perpetrators of them; neither can any one be unconscious of the horrible and sanguinary end of a conflict, which would have been the token of a civil war from Biscay to the Mediterranean, had Gen. Zurbano and his partisans progressed with impunity. Here let me repeat the words in my last letter—"The severity of the Government to political offenders is cruel; but the only acts of injury and wrong that may be brought against it, are those perpetrated to political offenders."

Our views have to be directed principally to the commercial faith of the Government. The financial measure of Spain is now of great interest, and the manner in which the Government grapples with it does it infinite credit. Weighed down, as it is, with accumulation on accumulations, the integrity of the kingdom is maintained; and, whilst the debts are acknowledged, every exertion is being made on the part of the Government to honourably liquidate them. The total of the public debt of Spain, decreed on the 16th March, 1808, at the time of the invasion of the French armies, amounted to 6,876,396,675 reals vellon, with an annual interest of 250,909,352 reals vellon. The following statement, extracted from the excellent work of Mr. Gregor, will be of great use to us, and will show what part of the debt stands without interest—this statement is a correct exhibition of the national debt of Spain, to the 31st December, 1833:—

	Capital.	Reals vellon.	Interest.
Debt prior to 18th March, 1808	6,876,396,675	250,909,352	10,000,000
Debt made by the first restoration	200,000,000	—	—
Constitutional loans—deduction made from the fifth convert	1,622,987,418	—	84,000,000
Loans of the second restoration	2,649,266,666	—	122,410,000
Debt provisionally owing to France	320,000,000	—	16,000,000
Oficial certificates (English debt)	60,000,000	—	3,000,000
French indemnities, levied by the Government, in virtue of the treaty of Paris in 1815	—	40,000,000	2,000,000
Clearing of the <i>fuente de reemplazo</i> , deduction made of ninety millions, included in the valuation of the debt made by the first restoration	296,104,892	—	92,026,223
Debt not cleared.	—	—	—
Amount of remittances, arrears of pay, indemnities, and general expenditure of the war of independence	3,300,000,000	—	59,000,000
Amount of indemnities due for confiscations and spoliation undergone by the citizens since 1815	500,000,000	—	25,000,000
Debt without interest.	—	—	—
Amount of arrears of public debt	10,148,202,296	—	—
Unsettled debt of Treasury, prior to 18th March, 1808	496,630,985	—	—
Ditto, of the first restoration	500,000,000	—	—
Ditto, of the Constitutional Government, and of the second restoration	500,000,000	—	—
Total of inscribed and cleared debt	12,064,475,551	—	590,246,175
Ditto, of debt not cleared	2,800,000,000	—	124,000,000
Ditto, of debt without interest	12,043,833,281	—	—
Grand total of public debt on 31st Dec., 1833	27,908,368,932	—	704,346,175

The debt of Spain, in January, 1842, is stated to amount to 14,160,958,047 reals, or 157,344,080 sterling—not including the amount stated in 1833, as debt without interest. A deficiency has existed, especially since 1830, in the Spanish budget. In 1843, it is estimated at 20,500,000 reals vellon, or 213,541 sterling. It has been left for the present Government to establish a better state of things. The Minister of Finance, in order to terminate a course of deficiencies so injurious to public credit, has established a new mode of assessing and levying the taxes, which has done much honour to his administration. His estimates for the year 1845 show an overplus of 708,000 sterling. Such a result would be immense, and would place the finances of Spain above those of the most flourishing nations in Europe. It remains for us to see if the expectations of the Government are consummated. We entertain great hopes that a surplus will be created, if not to the extent estimated by Senor Mon. The exertions used by the Government evince, beyond a shadow of a doubt, its commercial faith, and its sincerity to relieve the present condition of the kingdom. By entering more at large on this subject, I shall encroach too great a length on your valuable columns; I will, therefore, merely quote the words of the *Journal des Debats*, on the subject of Spanish finance, and go from the Government to the People. "It is to be hoped (says that journal) that, after the forthcoming harvest—and, thanks to the peace and good order maintained by the existing Government, with so much energy throughout the country—the revenue, at the conclusion of the year, may produce satisfactory results."

**The People.**—We are told by your correspondent "The Idler," that there are other writers on Spain, besides Mr. Gregor, from whose work I gave a short quotation on the character and habits of the Asturias. I have not confined myself to that author. I might have named at least a dozen writers, English and French, whose language corroborates his; whilst I might select, from private correspondence in my possession, of gentlemen long resident in the country, sufficient to fill a newspaper; but I prefer taking an extract from another work, of acknowledged historical correctness, which refers, in more general terms, of Spaniards generally, the quotation I before gave being confined to the habits of the Asturias principally.

Extracted from Dr. Lardner's *Cabinet Encyclopedia*, vol. 5, History of Spain and Portugal, p. 285:—"Of Spain, it may be truly said, that the internal resources are immense. The soil, the climate, the ports, the people—everything offers a foundation for her future greatness. And great she will be—probably, at no distant day. All who know her children, their chivalrous qualities, their pride, their scorn of sordid virtues, their sense of honour, their intellectual attainments, their inflexible virtues, must take a lively interest in their situation and prospects. With powers bounded by precedent, or by conscience alone—powers which, in other hands, might have proved fatal to the community—the Kings of Spain have seldom been tyrants. Her nobility and gentry are not more distinguished for illustrious descent, than for unsullied honour and boundless generosity. Her ecclesiastics—her secular priests especially—are so far from being ignorant, that they would honourably sustain a comparison with the clergy of the Established Church of England; and, so far from being slaves, that they have generally been among the foremost defenders of popular rights; in fact, no church has a nobler body. Her citizens—nay, even her rustics—are distinguished for intelligence, for an honest, hereditary pride, for the virtue of hospitality, of simplicity, of sincerity, in a degree, too, unexampled by other nations. To the prosperity of such a people, it is impossible to be indifferent. They contain, within themselves, resources sufficient to insure their future fortunes. Let but these resources be well directed, and a Spaniard will be a prouder title, than ever it was in the time of the first Carlos."

Such, Sir, is the description which unbiased writers give of Spain. In prosecuting my original intention, I will enter more at large on the provinces through which the Royal North of Spain Railroad is intended to pass, and their productions. The line (as is well known) will commence at Aviles, and terminate at Madrid; by reference to a map of Spain, and tracing the towns I stated the line would comprehend in its range, your readers will see that it takes a south-eastwardly direction, through a district thickly studded with towns and villages, and for the greater part through a level country. The first section of the proposed line is from Aviles, in Asturias, to Leon, a distance of ninety miles; of this portion thirty-five and a half miles have been surveyed, and the second trial plans and drawings produced. The Asturias is the Wales of Spain; her coal-fields are the most extensive in Europe, and her other mineral produce of considerable extent. The principal products of the Asturias are coal, iron, copper, lead, antimony, zinc, cinnabar, manganese, and barytes, with wheat, and maize, grapes, from which an inferior wine is made, cider, chestnuts, and other nuts in great abundance; whilst large numbers of cattle are reared. From a very distant period we have mention of copper and lead mines in this principality; but we have no data to prove the exact quantity produced, although, in 1780, we have an account, from Hoppensack, of average amount of produce of the mines in Spain.—*London, April 25.*

[Errata in my last letter.—"And through or near the important towns of

Oviedo, Leon, Valencia," &c., should have been "Oviedo, Leon, Valencia," &c. "Except pig-iron, made at the Catalan forges," should have been—"Except the iron made at the Catalan forges."]

[We are precluded by the length of our correspondent's letter, from giving it at length, but which shall have insertion in our next. As conveying much statistical information, it cannot be otherwise than valuable.]

## NORTH OF SPAIN RAILWAY.

Sir,—I beg to direct your notice to an error in the *Mining Journal* of last week, whereby it would appear, that the communication received by me, authorising the use of the name of her Majesty Isabella Seconda, Queen of Spain, in approval of the North of Spain Railway, and as patronising that undertaking, emanated from the Minister of Finance—whereas it will be seen, by the inclosed copy of letter, which I beg to hand you for your own satisfaction, and that of your numerous readers, that the communication was from her Majesty's Private Secretary. I should not have thought it necessary to notice the error, but that parties like the "Idler in the Asturias" might endeavour to convey an impression inconsistent with the facts, and to attribute the mistake to an improper source; I trust, therefore, you will take an early opportunity of making the necessary correction. Allow me here to observe, with reference to the accession of Don Manuel de Gavia, named by your correspondent, that such may have arisen from causes which it is neither his province or mine to inquire into—sufficient is it, as far as the interests of the company are concerned, that the vacancy caused by his secession was immediately filled up by the acceptance of office on the part of Don Mazario Carriquiri, Deputy for Navarre and banker, whose high honour and standing in society, as well as business habits, are too well known and appreciated to render any eulogium on my part necessary.—*Cleveland-row, April 24.*

RICHARD KELLY.

Translated from the Spanish by A. de Pina, Notary Public, official translator to Her Majesty's High Court of Admiralty of England, &c., &c.

Her Majesty's Private Secretary's Office, Madrid, April 3, 1845.  
Her Majesty, the Queen, my August Sovereign, having been apprised of the respectful communication you had the honour to address to her on the 23d January last, praying her Majesty to condescend to permit the railway which is to be opened from Aviles to this capital, under a concession, or grant, made in your favour by her Majesty's Government, to bear her august name, her Majesty has been pleased to command me to inform you (as, by her Royal Order, I do), that she deigns to accede to the aforesaid petition for the railway from Aviles to Madrid to bear her august name—thereby affording a new proof, how agreeable, in her Majesty's estimation, are those undertakings that tend to the general prosperity of these kingdoms. I communicate it to you by Royal order, for your information and satisfaction. God preserve you many years.

To Richard Kelly, Esq.

JUAN DOMESTICO CORTEZ,  
Her Majesty's Private Secretary.  
[We are obliged to Mr. Kelly for the correction of an error which was quite unintentional. The information we obtained was from a source on which we could place every confidence, but the insertion of "the Minister of Finance" for that of "the Private Secretary of the Queen," may have arisen from a misunderstanding on our part. We have only to add, that we are at all times obliged by corrections on authority, and with pleasure give insertion to Mr. Kelly's communication, with the translation accompanying it.]

## NORTH OF SPAIN RAILWAY.

Sir,—That your columns are open to correspondents, requires no other evidence than the insertion of the letter of "An Idler," which appeared in your last week's Number, and which, therefore, hardly requires on my part a request. It is, however, to be regretted, that the writer has not something to do whereby he might employ his time more usefully; for most "Idlers" become unconsciously—and, I might add, perhaps intuitively—"busy bodies" indulging their idle hours in reading Mrs. Centlivre's admirable comedy, or attempting to practise the freaks of Paul Pry, without possessing any claim to the virtues of that well-known character. Idlers are, moreover, proverbial for their assurance, to which may be too oft appended their ignorance—for it is only a natural conclusion that the one should accompany the other; while those who are the *chronos* of society must never attempt to vie with the *bee*, or expect that industry and idleness can be allowed to enter at the same gate, or be held in the same estimation. I will, with your permission, attempt a reply to the "Idler"—for to endeavour to cope with him in the arrogance of assumption, or carry conviction to his mind, would appear to me a task not of easy accomplishment, were it even worth the trouble. As I have not the pleasure of an acquaintance with "C. L. W.," it is hardly necessary to say that I am not his apologist—for I presume he is fully equal to the arduous task of crushing a butterfly; yet, as one possessing some slight knowledge of Spain and its resources, without being connected with the Royal North of Spain Railway, I may be allowed to say a word or two on the "rambling epistle," which an "Idler" has put forth. I wage not war with Narvaez, while the battle of Culloden and the Duke of Cumberland are, in like manner, passed by, as far as I am concerned—for I cannot imagine what the one or other, or even the mus and friars, or the Autocrat of Russia and the Poles, have to do with the subject on which your correspondent "Idly" writes—that of railroads in Spain. It is somewhat amusing to find an "Idler" correcting others, while he commits himself; for he observes, that he travelled over the line of road, from Leon to Valladolid, three months since, and was told, by a Government inspector of roads, "it would take five years to complete it." Is an "Idler" one of the valiant Spanish Legion, from the Emerald Isle?—if so, I think we may understand him. It is true, he states, that the *diligencia* from Oviedo is not exactly a sheep-pen, but synonymous (I quote his expression) with the *Menagerie Royale* of France. Surely an "Idler" must have picked up a goose-quill, when he thus further committed himself and his lucubrations to paper. El Senor Don Gil Blas de Santillana, with whom he appears to have some acquaintance, I take it, was a far more sensible and prudent man than your correspondent; who tells you, that "this hero travelled with mules," whereas, in the present instance, the writer and the mule travel together, as part and parcel of the whole—there being all the stupidity of the ass and the obstinacy of the mule. The remark of an "Idler," that "no one at present has seen Asturian iron," is all of a piece. With the writer, all means one, and one all. Hence, self-conceited as he is, he naturally concludes that, because he has not himself seen it, no one else has; why, the stag in the forest, who hid his head in the thicket, so that the hunters might not see him, displayed as much sense as an "Idler." He proceeds to state, that he "can see no reason for altering his opinion, though, perhaps, the figures"—referring to certain estimates made by him—"have a cypher too much." In this we both agree, that cypher is "the Idler," to use a figure of speech. I pass over his observations on the Spanish peasantry, as one calculated to detract from the character of an Englishman; but, as I before remarked, he is, doubtless, one of Dun's "finest pansy on the earth," and, not having lately had the advantage of being at the "Conciliation Hall," considers he may indulge in abuse of a nation, when the subject of his letter should have been confined to the railroads of Spain. What can be the object of the attack? Are the Irish or other nations more cleanly than the Spaniards, where want and penury pervades a district, or is it that "lying in the sun," and not "sitting at table, like Christians," has ought to do with "Railways in Spain?"

If the representation of an "Idler," even be correct, it is the first argument which might be adduced in favour of locomotive or railway enterprise; a ready mode of transit would be made, whereby the produce of the interior would find its way to the outports, and the imports of other lands would be acquired with facility, and at a reduced cost, so as to enable the peasantry, those whom he would stigmatise and hold up to detestation, more comfortable—at the same time, that the employment of labour, as well as capital, in the country, would render them, if not as independent as an "Idler," at least, perhaps, as happy and more contented with the station which it has pleased Providence they should fill. The opinion of your correspondent will, doubtless, be entertained most highly by those who are the most profoundly ignorant, and I can only express my surprise that he should talk of looking for statistics, when it would appear he is in possession of all—in fact, the very *ne plus ultra*, which qualifies him for the office of president or porter in any undertaking, where his services may be required. The retirement or withdrawal of Don Manuel de Gavia, to which he makes reference, is, I suppose, under some peculiar circumstances, which an enquiry at the offices of the company would, doubtless, explain; but, as his accession or secession does not affect the enterprise, an "Idler" is welcome to all he can make of the *assertion*, which, in this particular instance, it is only due to him to state, I do believe to be matter of fact. The intimate knowledge which your correspondent appears to have with Talacro, convinces me that he is not what he would seem; perhaps, he is a species of lignite, a sort of wood coal, who being disappointed at home, has gone abroad, and in the absence of El Clamor Publico or El Heraldo, giving insertion to his rhapsodical, is willing to incur the expense of postage, in giving to the "British public" the benefit of his experience (?)—at the same time, I do hope, Mr. Editor, you take care to be paid for it as an advertisement. The pretty little episode on the 2 per cent. premium and the 4 per cent. discount, and the "moves" of London directors, can only be understood by those who are as well versed as your correspondent appears to be. If he is one of the disappointed, in not obtaining shares in the Royal North of Spain Railway, let him take my advice, to "go and buy them;" but, at the same time, I would recommend him to bear in mind, that it is necessary he should take the "Spanish" in his pocket, or "bear," as he may be in this particular *line*, the jobbers or brokers of the house will not bear with him.

In giving insertion to the letter of "Industria," we must say, that his communication is equally as foreign to the subject, as that of "An Idler in the Asturias." The latter possesses information from undoubted channels, on which dependence may be placed, although we regret he did not confine himself to the main point propounded in his letter. We do not think that discursive matter, touching upon politics, or the domestic habits of Spain, or any other country, or a reference to the "doings" of certain aldermen, or the "movements" in the Stock Exchange, or its purloins, have ought to do with the question at issue. We hope, in any further communication from correspondents on this subject, they will be found to "bear," to use our correspondent's expression, on the point.]